Mission Statement

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations

DOI-BLM-WY-100-EA-14-77

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1.0 INTRODUCTION

TITLE: Pinedale Resource Management Plan (RMP) Environmental Assessment (EA) Amendment for Plains Exploration and Production (PXP) Parcels, DOI-BLM-WY-100-14-77.

This Environmental Assessment (EA) has been prepared to analyze and disclose the impacts of changing the mineral leasing allocation of 5,120 acres of subsurface federal mineral estate managed by the Pinedale Field Office of the Bureau of Land Management (BLM). These lands are currently available for leasing as "Traditional Area" under the approved *Pinedale Resource Management Plan* (2008) and as amended/approved on September 21, 2015, by the *Approved Resource Management Plan Amendments for the Rocky Mountain Region, including the Greater Sage-Grouse Sub-Regions of Lewistown, North Dakota, Northwest Colorado, and Wyoming/Record of Decision* (2015). The acreage is privately owned surface, with federally-owned subsurface minerals estate, also known as split-estate lands. According to the Pinedale Field Office's Resource Management Plan (RMP) of 2008, (Record of Decision (ROD) pg. 1-7), this mineral estate is available for oil and gas leasing, exploration and development.

Location of Planning Area: The planning area is approximately 5,120 acres located at Township 36 North, Range 113 West, Sections 22-27, 34, 35, Sublette County, WY. **(See Map 1).**

Action: The RMP amendment would change the RMP designation for the 5,120 acres from "Traditional Area" to "No Surface Occupancy" or "Unavailable Area" for fluid mineral leasing and development (ROD, pg. 2-19 – 2-21).

1.1 BACKGROUND

The Wyoming Range Legacy Act boundary, originally proposed by the late-U.S. Senator Craig Thomas and finalized by his successor U.S. Senator John Barrasso, did not cover the 5,120 acres of split-estate private property that defines this planning area (Maps 2-4).

The Bridger-Teton National Forest (BTNF) published a Draft Environmental Impact Statement (DEIS) on December 10, 2010 analyzing a proposal from the Plains Exploration & Production Company (PXP) to drill up to 136 oil and gas wells for the Eagle Prospect and Noble Basin Master Development Plan. The wells were proposed on U.S. Forest Service (USFS) surface lands, in the Wyoming Range, located about seven miles southeast of the Town of Bondurant in Sublette County, Wyoming, with the federal mineral estate administered by the BLM.

Leases in the original PXP project area were issued between June 1994 and June 1995 as provided under the 1990 Bridger-Teton Forest Plan (Land and Resource Management Plan (LRMP)). Nine of these leases are located within the BTNF and seven of the leases are located on BLM-administered lands, all with federal subsurface mineral estate that is managed by the BLM-PFO.

According to the Forest Service's 2010 DEIS, within the entire PXP project area there were 240 acres of surface lands managed by the BLM and 9,827 acres of privately-owned lands with subsurface federal mineral estate (i.e., split estate). In 2011, the BTNF issued a Supplemental EIS (SEIS) with a decision and then withdrew their decision for no fluid minerals leasing in the area based on the need to supplement the air quality analysis and wildlife analysis. The USFS' decision

to withdraw leasing followed a successful challenge to the Interior Board of Land Appeals (IBLA) over the BLM's federal action to offer the federal oil and gas leases of these USFS-managed lands. Additional air quality and wildlife analyses were completed for the proposal as well as consideration of new information concerning federally-listed threatened and endangered wildlife (e.g., Canada lynx), effects on local air quality, other energy development in the area, and submitted public comments. In June 2012, the BTNF was developing its Supplemental Draft Environmental Impact Statement (SDEIS) for this project and deferred fluid mineral leasing and development until a new decision was issued. The Forest Service switched to a new preferred alternative in 2016 after a series of public meetings and comment periods that returns to the earlier "Unavailable Area" for oil and gas leasing decision for the subsurface federal fluid minerals estate.

A grassroots effort to purchase all of the PXP oil and gas leases in the vicinity was pushed by a broad coalition of local landowners, outdoor recreationists and wildlife enthusiasts primarily from the Jackson, WY area, and environmental advocates that wanted the near-pristine conditions of the Wyoming Range protected. In July 2012, The Trust for Public Land (TPL) reached an agreement to purchase PXP's 57,662 acres of oil and gas leases in the vicinity of the planning area. To purchase the fluid minerals leases, TPL raised $8.75 million in just five months, with a number of other organizations and the public contributing.

In December 2012, TPL finalized the purchase of the rights granted under the federal oil and gas leases held by PXP. The three leases (WYW132828, WYW135155, WYW136359) were allowed to expire between November 4, 2013 and January 4, 2014. On June 3, 2013, the Wyoming BLM State Director (SD) deferred the re-offering of new fluid mineral lease acreage until a decision on the continued availability of these lands' subsurface federal fluid minerals estate could be made through the necessary National Environmental Policy Act (NEPA) analysis.

Of the 57,662 acres of oil and gas lease rights purchased by TPL: 47,779 are U.S. Forest Service-administered surface lands and 4,763 acres are administered by the Pinedale Field Office and are unavailable for oil and gas leasing. The remaining 5,120 acres of split-estate lands are identified in the 2008 Pinedale RMP as amended (2015) as being available for future fluid minerals leasing as a "Traditional Area," if nominated by potential lessors or any other member of the public expressing an interest in seeing the subsurface fluid mineral estate developed for natural gas, oil and/or coalbed natural gas wells.

The Wyoming Range Legacy Act of 2009, covers approximately 85% of the TPL acquired leases – largely on the adjacent Bridger-Teton National Forest managed public lands was signed into law as part of the Omnibus Public Land Management Act of 2009 (P.L. 111-11) and allows federal oil and gas leases to be retired permanently when bought out, instead of being resold to other Operators.

On December 16, 2016, the Forest Service published a Final Supplemental Environmental Impact Statement (FSEIS) for Oil and Gas Leasing on 39,490 acres on the eastern slope of the Wyoming Range within the boundary of the Bridger-Teton National Forest in Sublette County, Wyoming. The FSEIS preferred alternative was to withdraw consent for oil and gas leasing within this area, and the Forest Service indicated that the Undersecretary of Agriculture, Robert Bonnie, would sign the ROD withdrawing consent for leasing thirty days after publication of the Notice of Availability

(NOA) of the FSEIS in the Federal Register on December 16, 2016. The area where the Forest Service will be withdrawing consent to oil and gas leasing is near the 5,120 acres of private surface – federal minerals that the BLM is considering to make unavailable for oil and gas leasing.

Additionally, 2,560 private surface acres of the 5,120 private surface acres have been protected by conservation easements. The BLM's Jonah Interagency Office/Pinedale Anticline Project Office (JIO-PAPO) contributed $5,000,000 toward the Sommers-Grindstone Easement as part of the offsite mitigation strategy resulting from both the Jonah Infill and Pinedale Anticline RODs. Another private organization contributed funds towards the purchase of the conservation easement.

1.2 Purpose and Need for the Action

The purpose of the action for the BLM is to determine the appropriate management of the subsurface federal fluid minerals estate in the planning area. The need for the action is to respond to concerns from the public and the Governor of Wyoming regarding the appropriate level of protection for sensitive resources within the planning area.

Decision to be Made:

The BLM Wyoming State Director (SD) is the Deciding Officer. Based on information in this EA, the SD will decide whether or not to amend its 2008 Pinedale RMP as amended (2015) to change the oil and gas leasing allocation for the 5,120 acres of subsurface federal fluid mineral estate from Traditional Area to Unavailable Area or No Surface Occupancy for fluid minerals leasing.

1.3 Relationship to Statutes, Regulations, Plans or Other Environmental Analyses

The Action would comply with all federal, state and local laws. The Action Alternatives are consistent with the objectives, goals and decision of the 2008 *Pinedale Resource Management Plan* (RMP) as amended (2015). This Environmental Assessment (EA) is in compliance with the *National Environmental Policy Act* (NEPA) of 1969, as amended, and the *Federal Land Policy and Management Act* (FLPMA) of 1976, as amended. While FLPMA directs the BLM to provide for multiple uses on public lands and resources, it is not considered a mandate for all multiple uses on all acreage. The alternatives in this EA would also be in compliance with the objectives and goals identified in the *Approved Resource Management Plan Amendments for the Rocky Mountain Region, Including the Greater Sage-Grouse Sub-Regions of Lewistown, North Dakota, Northwest Colorado, and Wyoming/Record of Decision* (ARMPA) (BLM, 2015).

1.4 Scoping, Public Involvement and Issues

The BLM received a total of 95 comments during the 30-day public scoping period for this project which ended on June 9, 2014. Eighty-six of the comments said they supported the alternative to reclassify the project lands as an Unavailable Area for fluid mineral leasing. These included comments from The Greater Yellowstone Coalition, Wyoming Game and Fish Department, Wyoming Outdoor Council and Theodore Roosevelt Conservation Partnership.

The remaining comments included a letter from Wyoming Governor Matt Mead's Office asking the BLM to evaluate removing the project lands from availability for oil and gas leasing in the future and to consider a "No Surface Occupancy" alternative, which would keep oil and gas leasing available for the 5,120 acres, with drilling access from state, national forest or private lands near the property in this proposal, but not directly on the surface of that acreage.

Other comments included:

The Sublette County Conservation District asked for the consideration of the implications of the permanent status as "Unavailable Area" for fluid minerals leasing on private property rights.

Another commenter asked that the planning area be protected for wildlife, recreation and conservation, and that removal of oil and gas leasing from the area would help prevent fires.

Another commenter supported removing the project lands from leasing and writes that development on these lands would have a negative impact on the ecosystem. Another comment stated that no leasing provides open space, clean air and wildlife habitat and that deer and antelope need winter range.

A comment was outside of the EA scope and is not applicable to this EA.

Another comment asked the BLM to consider other lands for removal from future leasing, which is outside of the scope of this analysis.

The Wildlife Conservation Society supported removing the planning area lands from future minerals leasing. They also commented if the planning area is available for minerals leasing, pronghorn antelope will avoid the area. They noted if the area is developed, pronghorn antelope vulnerability would be increased and that migrating pronghorn would avoid developed areas. They said that unmitigated migration impediments could eventually extirpate important migration routes, including those found in the RMP amendment area.

One commenter submitted a comment not supportive of the alternative to remove oil and gas leasing from the planning area's 5,120 acres. The commenter wrote that he was concerned that wealthy individuals with an environmental agenda were taking lands with resources out of the leasing pool.

Issues raised during scoping:
Development on these planning lands could have a negative impact on the ecosystem.

Impacts to deer and pronghorn winter range.

Withdrawal of oil and gas leasing could have impacts to private property rights.
See attached Appendix A for the Scoping Comment Summary.

ALTERNATIVES

2.1 Traditional Area for Leasing Alternative (No Action Alternative)

Section 1502.14 (d) of the NEPA requires that alternatives analyzed in an EA include a No Action alternative. No Action means the action alternatives would not be approved and the 2008 Pinedale RMP as amended (2015) would not be amended. The 5,120 acres would remain available for natural gas, oil and/or coalbed natural gas development and production as a Traditional Area for fluid mineral leasing subject to the constraints identified in the 2008 Pinedale RMP as amended

(2015), which include Controlled Surface Use, No Surface Occupancy, and Timing Limitation stipulations.

2.2 No Surface Occupancy Alternative

The No Surface Occupancy (NSO) Alternative would continue to allow oil and gas leasing for the 5,120 acre planning area, but would attach a NSO stipulation to the entirety of the split-estate planning area lands. Any future development of these parcels, should they be offered and sold, would require that they be developed from an off-lease location. If an Expression of Interest (EOI) received by the BLM Wyoming State Office is partially or wholly within the area designated as NSO, the proposed lease parcel description would have a NSO stipulation attached to it. If the parcel or parcels were to be sold at auction, proposed development would have to occur from outside of the NSO area from surrounding private, Forest Service, state, and/or BLM-managed lands (Maps 1, 3, 4).

With this action alternative, the only access to the subsurface fluid minerals would be from private, state or other federal lands adjacent to the planning area (Map 3). Access could also be made from adjacent BLM-administered public lands via an approved BLM right-of-way (ROW). Any ROW applications would require additional environmental analyses.

2.3. Unavailable Area for Leasing Alternative

This action alternative would amend the 2008 Pinedale RMP as amended (2015) to change the status of the 5,120 split-estate acres from "Traditional Leasing Area" to "Unavailable Area" for fluid minerals leasing, as identified in the 2008 Pinedale RMP ROD as amended (2015) (Maps 1-3). Existing leases within the planning area have expired and the area has been deferred by the Wyoming State Director for the BLM from leasing pending the outcome of this NEPA process.

2.4 Alternatives Considered but not Analyzed in Detail

No other alternatives were identified. Alternatives considering using Version 3 or Version 4 of Greater Sage-Grouse Core Habitat to define Greater Sage-Grouse Priority Habitat Management Areas (PHMA) for the PFO were considered, but not analyzed because the planning area is within a General Habitat Management Area (GHMA) for Greater Sage-Grouse so the resultant analysis would not change (BLM IM WY-2016-024).

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

The planning area, located approximately seven miles southeast of Bondurant, WY, is located on a scenic high mountain plateau of rolling sagebrush and grass covered hills dotted by forested areas. From the planning area, several mountain ranges are visible including the Wind River Mountains, the Gros Ventre Range and the Wyoming Range.

The 5,120-acre planning area is located entirely on private surface estate; 2,560 of those acres are held by private conservation easements, though it still largely functions as working ranchlands. According to the current Pinedale Field Office RMP (BLM, 2008[a], p. 2-19 – 2-24) the federal mineral estate, is located within an area identified as a "Traditional Area" - available for oil and gas leasing and development subject to restrictions on surface use. In this case, the planning area

is in a Minimally Developed Area (MDA) as compared to an Intensively Developed Field (IDF) like the Pinedale Anticline and LaBarge Platform. Surrounding the planning area, private property is used primarily for ranching and private housing. Other lands are administered by the U.S. Forest Service and state of Wyoming (Map 1). Land uses in this area include ranching, grazing and dispersed recreation including hunting, angling, and camping.

The Sublette County Comprehensive Plan (Sublette County, 2003, p. 13; 38; 41; 63) identified scenic values as part of the goals for the county. One of the primary county goals for recreation is to consider the county's natural beauty, rural atmosphere, wildlife, and recreational resources for the benefit of present and future generations. These goals apply to the rural planning area while the county's plan speaks to support for oil and gas production as a large, economic driver in Sublette County, but concentrated in identified intensive developments like the Jonah, Pinedale Anticline, LaBarge, and proposed NPL fields.

Several residential developments, including the Thunder subdivision, Jim Bridger Estates, Aspen Ridge, the Rendezvous Ridge subdivision and the Merna area, are adjacent to the main access route into the planning area. A main access road to the planning area is U.S. Highway 191 to the Merna Road, the Merna-North Beaver Road 23-115 to U.S. Forest Service Road 10359. Hoback Ranches, another large residential subdivision, is about one mile from the planning area boundary.

The following table (Table 3-1) notes resources typically considered in environmental analyses. For each resource, a determination is made whether that resource is present in the planning area and could be affected by any alternative chosen from this EA. Resources determined not to be present (NP) or that there would be no impact (NI) to those resources are not considered further in this EA.

Table 3-1. Resource Determinations:
NI: No Impact expected from action alternatives
NP: Not Present in the area impacted by the action alternatives
PI: Potential Impact due to one or more action alternatives; analyzed in the NEPA document

Determination	Resource	Rationale for Determination
PI	Air Quality/Green House Gas Emissions	See Section 3.2
NP	Areas of Critical Environmental Concern	ACECs are not present in the planning area.
PI	Cultural Resources	See Section 3.3
PI	Hazardous and Solid Wastes	See Section 3.4
NI	Environmental Justice	The action alternatives were reviewed in accordance with Executive Order 12898 and

Determination	Resource	Rationale for Determination
		no minority or low-income populations are known in the area; no impacts are expected.
NP	Farmlands: Prime or Unique	No Prime or Unique Farmlands (as defined by 7 CFR 657.5) are present in the planning area.
PI	Floodplains	See Section 3.12
PI	Fuels/Fire Management	See Section 3.14
PI	Invasive Species/ Noxious Weeds	See Section 3.11
NI	Lands/Access	No rights-of-way or other land use authorizations are required to implement any of the alternatives considered.
NP	Lands with Wilderness Characteristics	All surface is privately owned and lands with wilderness characteristics are not present within the planning area.
PI	Livestock Grazing	See Section 3.5
PI	Native American Religious Concerns	Planning area is entirely private surface.
PI	Noise	See Section 3.7
NP	Paleontology	Not present
PI	Recreation	See Section 3.8
PI	Socioeconomics	See Section 3.9
PI	Soils	See Section 3.10
PI	Special Status Plant Species	See Section 3.11
PI	Special Status Wildlife Species	See Section 3.15
NP	Threatened, Endangered or Candidate Plant Species	None known in the planning area

Determination	Resource	Rationale for Determination
PI	Threatened, Endangered or Candidate Animal Species	See Section 3.15
NP	Traditional Cultural Properties	Not known in the planning area
PI	Water Resources	See Section 3.13
PI	Wetlands/Riparian Zones	See Section 3.12
NP	Wild and Scenic Rivers	Not present in the planning area
NP	Wilderness	No wilderness or Wilderness Study Areas are present within the planning area.
PI	Woodlands/Forestry	See Section 3.11
PI	Vegetation	See Section 3.11
NP	Visual Resources	Planning area is all private surface, BLM VRM classes are not applicable.
PI	Wildlife/Fisheries	See Section 3.15

RESOURCES

3.2 Air Quality

Regional air quality is influenced by the interaction of meteorology, climate, the magnitude and spatial distribution of local and regional air pollutant sources, and the chemical properties of emitted air pollutants.

To protect human health and welfare, the Clean Air Act (CAA) requires the Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) for pollutants harmful to public health or the environment. The Wyoming Department of Environmental Quality-Air Quality Division (WDEQ) monitors and enforces air-quality standards. Wyoming Ambient Air Quality Standards (WAAQS) and NAAQS identify maximum limits for concentrations of criteria air pollutants at all locations to which the public has access. The WAAQS and NAAQS are legally enforceable standards.

The Interagency NEPA Air Quality Memorandum of Understanding (MOU) (June 23, 2011) establishes common procedures for the BLM, National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), EPA, and U.S. Forest Service (USFS) to follow in analyzing and mitigating the potential air quality impacts of proposed oil and gas activities on federally-managed public lands through the NEPA process.

Criteria air pollutants, Hazardous Air Pollutants (HAPs), and Air Quality Related Values (AQRVs), such as visibility and atmospheric deposition are the components of air resources which the BLM must consider and analyze to address the potential effects of federal actions on air resources as part of the planning and decision making process.

The EPA has set NAAQS for the following criteria pollutants: ozone (O_3), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter ($PM_{2.5}$ and PM_{10}), and lead (Pb). Air-pollutant concentrations greater than the NAAQS represent risks to human health. If the air quality in a geographic area meets the NAAQS, it is designated as an *attainment* area; areas that do not meet the NAAQS for any of the criteria pollutants, are designated *nonattainment* areas for that pollutant and must develop comprehensive state plans to reduce concentrations to a safe level.

The planning area is located in the Upper Green River Basin (UGRB) 'marginal' nonattainment area for ozone as designated by the EPA on April 30, 2012 based on the 2008 8-hour average ozone standard of 75 parts per billion (ppb). The formal designation went into effect on July 20, 2012.

As a result of the marginal nonattainment designation, the BLM must comply with General Conformity regulations in 40 CFR 93 Subpart B. Project applicants must also comply with Chapter 8, Section 3 of the Wyoming Air Quality Standards and Regulations (WAQSR). Under federal regulations, the BLM is required to conduct a General Conformity analysis and cannot approve any action that would cause or contribute to a significant increase in the frequency or severity of any existing nonattainment violation (BLM, 2008[a], p. 2-10 – 2-11; BLM, 2016).

The BLM must include a conformity analysis for federal actions that is based on projected annual emissions from any proposed projects; the conformity analysis is conducted only for the selected alternative. Federal actions estimated to have an annual net emissions increase less than the *de minimis* threshold of 100 tons/year of oxides of nitrogen (NOx) or VOCs (precursor pollutants that form ozone in the atmosphere) for ozone nonconformity do not require additional analysis under the General Conformity regulations and may be authorized by the BLM without a formal determination. By law, the BLM's conformity analysis excludes any portion of any proposed projects that requires a permit under the state of Wyoming's New Source Review (NSR) or Prevention of Significant Deterioration (PSD) programs since permitted activities are presumed to conform to the EPA-approved, state of Wyoming's SIP (BLM, 2016).

Climate Change and Greenhouse Gases

Climate change refers to any significant change in the measure of climate, such as precipitation and temperature, lasting for an extended period (decades or longer) and is outside of the normal, expected range. As modeled, air temperatures in western Wyoming are expected to increase by 0.25ºF to 0.4ºF per decade and precipitation is expected to decrease by 0.1 to 0.6 inches per decade from base levels (BLM, 2016).

Several activities, conditions, and events that occur in the PFO management area may contribute to regional or global climate change, including: large wildfires, activities using combustion engines, changes to the natural carbon cycle, changes to radioactive forces and reflectivity, and emissions of greenhouse gases (GHGs). Some GHGs, such as carbon dioxide (CO_2) and methane (CH_4), occur naturally. These and other GHGs, including nitrous oxides (NO_x), and fluorinated gases are created and emitted through human activities, including oil and gas development (BLM, 2008[a], p. 2-10; BLM, 2016).

Currently, neither the EPA nor the WDEQ have regulations controlling the emission of GHGs, although these emissions are indirectly related to various other air quality related regulations. By policy, the BLM must consider GHG emissions and climate change as part of the planning and decision making processes (DOI, 2009 - Secretary Order 3226-Amendment 1; BLM, 2008[c] - NEPA Handbook; BLM, 2014 - IM 2015-020).

3.3 Cultural Resources

Class III cultural resource inventories have not taken place within the eight privately owned sections that are being analyzed for this project. However, within a radius of five miles of the area surrounding the Area of Potential Effect (APE), 26 linear Class III inventories and 26 Class III area inventories have occurred. Of the 26 linear inventories, 12 have been in support of oil and gas operations, four were range projects, four were for roads, three were associated with utilities, and three were for timber sales. Of the 26 area inventories, nine involved oil and gas operations, seven were associated with timber sales, six were for range projects, two involved forest management, one was for mining, and one was for a utility project.

Altogether, these 52 inventories identified 30 archaeological sites. Twenty of these sites are prehistoric; of these 20 sites, one has been determined by the BLM to be eligible for the National Register of Historic Places (NRHP), 17 are not eligible, and two have not yet been evaluated for eligibility. All of these prehistoric sites are either simple lithic scatters (n=17) or lithic scatters with a single associated hearth feature (n=3). N equals the number of lithic scatters. Nine of the 30 recorded sites are historic, of which one has been determined eligible, seven are not eligible, and one remains to be evaluated for eligibility. These nine sites include two cabins, two historic schools (one of these is the eligible historic site within the analysis area), one water tank, one dugout of indeterminate purpose, and one historic inscription site. A single multicomponent site including a prehistoric lithic scatter and historic debris has been determined to be eligible under NRHP.

Based on these findings, the prehistoric sites that are likely to be encountered within or adjacent to the planning area are small lithic scatters containing stone tools, debitage, occasional scatters of fire-cracked rock, and, more rarely, a limited number of hearths. Sites of this nature tend to represent short-term campsites and not long-term occupations. Historic sites near the analysis area represent a variety of purposes associated with homesteading such as cabins, schools, and ranching or similar subsistence functions.

These sites may or may not have Tribal significance.

3.4 Hazardous and Solid Wastes

There are currently no known hazardous and solid waste sites on the lands in question. The project lands are primarily split estate with private surface and the ranching operations and their potential to handle or store hazardous and solid wastes on these lands are not known. Common household trash and sewage outputs are expected as are fuel and equipment maintenance products.

For oil and gas operations, any substance designated pursuant to section 311(b)(2)(A) of the Clean Water Act (CWA); any element, compound, mixture, solution, or substance designated pursuant to section 102 of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) commonly known as the Superfund regulation; any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress); any toxic pollutant listed under section 307(a) of the CWA; any hazardous air pollutant listed under section 112 of the Clean Air Act; and any imminently hazardous chemical substance or mixture with respect to which the EPA Administrator has taken action pursuant to section 7 of the Toxic Substances Control Act. The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance in the first sentence of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).

There are existing hydrogen sulfide (H_2S)-tainted oil and gas operations in the vicinity of the planning area. As part of any development proposal submitted by an operator should the fluid mineral leases be sold, there must be a H_2S contingency plan. This plan would describe how it would protect employees and the public from H_2S emissions during normal operations as well as in the case of an operational upset. Usually, the H_2S plan is submitted as part of the enforceable Application for Permit to Drill (APD) package for each proposed well.

3.5 Livestock Grazing (Rangeland Resources)

Since the establishment of the towns surrounding the planning area at the end of the 19th Century, the area has been primarily used for livestock grazing. The entire 5,120 acre planning area, 50% in conservation easement preventing future surface development, is privately-owned and is still dedicated to cattle production. The planning area is sagebrush and grass-covered rolling hills, with some timber. Area ranchers' herds graze private, U.S. Forest Service, BLM and state lands, including lands in the planning area (USFS, 2010, p. 3-25 – 3-118).

3.6 Mineral Resources

Note: This discussion is restricted to the leasable fluid minerals portion of the subsurface federal mineral estate underlying the planning area. Solid minerals such as gravel, bentonite, coal, uranium, trona, silver, and gold were not considered in this analysis and were outside of the public scoping.

Based on the 2008 Pinedale RMP's as amended (2015) Reasonably Foreseeable Development (RFD) assessment (BLM, 2016), the resource area lands could see 20 conventional oil and gas wells per township proposed during the life of the RMP. The planning area equals roughly a quarter of the township, therefore the RFD scenario for the 5,120 acre planning area is up to five conventional oil or gas wells.

Records indicate that PXP, the publicly-traded company with the last known exploration plans in the vicinity, but not necessarily within the 5,120 acre planning area, had applied for three APDs in 2006. Their proposed target for natural gas extraction was the Mesa Verde 1 formation. The wells were never drilled, most likely based on financial feasibility tied to the planning area's relative remoteness and lack of suitable roads, projections for production from the target oil and gas reservoirs, market prices for petroleum-based energy, and possibly the company's and its stockholders' priorities.

Pixley Creek and Miller federal wells, operated by the Richardson Operating Co., are drilled into the Lance and Mesa Verde formations and are located about four miles southeast of the edge of the Eagle Prospect and Noble Basin exploration projects that were previously considered, but rejected by the USFS (Map 4). The Eagle Prospect proposal's project area included these 5,120 acres. Those natural gas wells are located an estimated five miles from the planning area and produce about 1000 to 2000 thousand cubic feet of gas (mcf) of gas per month (Map 4). Compared with natural gas wells in the area, such as the Pinedale Anticline, that production is low. Anticline wells produce an estimated seven to thirty times that amount of gas each month (Michael McLaren, PFO Petroleum Engineer, personal communications 2016).

Wells in the Wyoming Range are also prolific producers and include the ExxonMobil Madison formation wells (Merry Gamper, BLM Wyoming State Office, Fluid Minerals Program, personal communications 2016). Other development in the Wyoming Range includes both shallow oil and deep gas. Horizontal development of both oil and gas bearing formations has been sporadic since 2000, but EOG Resources Inc. proposed six new exploratory, horizontal oil wells using improved technology and reaching more than one mile horizontally after drilling about 7,000 feet down in the eastern flank of the LaBarge Field. Helium development has been approved under the Rands Butte project (BLM, 2009). The Rands Butte project, as one of a few helium projects in the nation, is of national significance.

Besides ranching, the oil and gas industry has been a principal industry in Sublette County for at least 100 years, providing a majority of the tax base. Historically, oil and gas development has been concentrated in the southwestern part of the county. Going back to roughly the year 2000, large oil and gas developments of international importance have occurred in the southeastern and central portions of the county.

The nearest producing field to the planning area is the Merna gas field, discovered in 1966, and located in T36N and T35N, R112W (Map 2), according to the Wyoming Oil and Gas Conservation Commission (WOGCC, 2006). According to WOGCC records, a total of 180 million cubic feet (MMCF) of gas and 712 barrels (BBLs) of oil have been produced from this five-well field, with most of the production occurring since 2002.

The nearest gas well, which has a total depth of 13,535 feet, is located about two miles from the planning area in T36N, R112W, Section 20 (Table 3-2, Map 4). Other nearby fields include Maki Creek and Ote Creek in T33N, R114W. A total of 523 million cubic feet (MMCF) of gas and 9,098 barrels (BBLs) of oil have been produced at Maki Creek since its discovery in 1980. Since its discovery in 1976, 283 MMCF of gas and 8,864 BBLs of oil have been produced at Ote Creek. Recent drilling in the area includes two wells in the Hoback Basin near Cabin Creek and Bondurant (USFS, 2004[a]).

Sand and gravel operations are the only other mineral developments in Sublette County. Although much of Sublette County has underlying coal deposits, they are of little economic value with no coal mining occurs near the planning area (USFS, 2010, p. 3-51).

Two producing natural gas wells and three plugged and abandoned oil and gas wells are from one to three miles east of the planning area (Table 3-2, Map 4). Four additional APDs were submitted, but were denied by BLM-PFO.

TABLE 3-2– OIL AND GAS WELLS IN THE VICINITY OF THE PLANNING AREA

NAME	LOCATION Sec-T-R	QTR/QTR	CASE NUMBER	OPERATOR	STATUS	DATE
Miller Federal 7-4	4-35N-112W	SWNE	WYW136345	RICHARDSON OPERATING CO	PGW	08/10/2003
Miller Federal 1-4	4-35N-112W		WYW136345	WILLIAMS PROD RMT CO	UAPD	09/07/2004
Miller Federal 2-4	4-35N-112W		WYW136345	WILLIAMS PROD RMT CO	UAPD	09/07/2004
Merna 2	20-36N-112W	SWSE	WYW78701	EOG RESOURCES INC	P+A	11/30/2011
Sage Flat Federal 7-20	20-36N-112W	SWNE	WYW136841	WILLIAMS PROD RMT CO	UNOS	01/09/2002
Sage Flat Federal 17-20	20-36N-112W	SWSE	WYW136840	EOG RESOURCES INC	P+A	10/19/2006
Merna Federal 3-28	28-36N-112W	NESW	WYW10613	E P OPERATING CO	P+A	11/03/2003
Pixley Creek Federal 4-28	28-36N-112W	NWNW	WYW136841	RICHARDSON OPERATING CO	PGW	07/21/1997
Cow Gulch Federal 7-33	33-36N-112W	SWNE	WYW136843	EOG RESOURCES INC	ABD	10/09/2012
Cow Gulch Federal 15-33	33-36N-112W	SWSE	WYW136843	EOG RESOURCES INC	LOC	06/18/2002
Roberts Federal 14-34	34-36N-112W	SESW	WYW136843	WILLIAMS PROD RMT CO	UAPD	09/07/2004

PGW: Producing Gas Well; UAPD: Unapproved Application for Permit to Drill; UNOS: Unapproved Notice of Staking; LOC: Location built but well not drilled; P+A: Plugged and Abandoned; ABD: Abandoned

3.7 Existing Noise Levels

Existing noise levels in the planning area are low. The planning area is rural and has little to no industrial development as it is largely unbroken ranchland. Noise sources include roadway and off-highway vehicles and seasonal hunting. Noise from vehicles would be generated from U.S. Highway 191, Sublette County Road #23-155, and USFS Roads. However, these roads are not heavily traveled and U.S. Highway 191, the largest highway in the area, is several miles from the project boundary. There is also potential off-highway vehicle use in the planning area by the landowners, their staff, and guests. Noise from the road network are long-term, but intermittent (USFS, 2010, p. 3-17 – 3-19). Noise from private landowner operations is unknown, but is likely to be tied to regular traffic and heavy equipment operation.

The planning area is characterized by open meadows with some forested areas. Vegetation includes lodgepole pine, Douglas-fir and subalpine fir. Aspen woodlands are found alone and mixed with the conifers. No sound level measurements are known to have been undertaken in the planning area. However, some data are available for the soundscape from a nearby area in northwest Wyoming in similar habitat. Sound levels were measured at Fern Lake in Yellowstone National Park in 2006 (Burson, unpublished data).

Anthropogenic sounds in the Fern Lake area are similar to those in the planning area, primarily distant vehicles and overhead aircraft. Human-created sounds in both areas are relatively uncommon, likely occurring less than 50 percent of the time. Sound levels at the Fern Lake area are shown in Table 3-3 and Figure 1 and are assumed to approximate planning area sound levels.

Scientists from the Natural Sounds Program of the National Park Service modeled sound levels throughout the United States (Fristrup, 2015). Dr. Fristrup and colleagues predicted that sound levels in much of rural Wyoming ranged from <20 dBA to <30 dBA, similar to levels measured at the Fern Lake study site.

Sound levels in the planning area are estimated to range from 20 dBA to 30 dBA, depending on time of year (spring/summer is the loudest), meteorological conditions (primarily wind speed), traffic conditions, hunting seasons, and private operations; see appendix D (Ambrose and Florian, 2013).

Table 3-3. Monthly L50 (L50 is the median noise level collected over a time period, or the level exceeded 50% of the time) dBA sound levels near Fern Lake, northwest WY, Jan-Nov 2006

Month	L50
1	20.5
2	21.4
3	23.4
4	20.8
5	28.9
6	25.5
7	20.3
8	21.1
9	21.9

10	22.2
11	22.4
12	NA

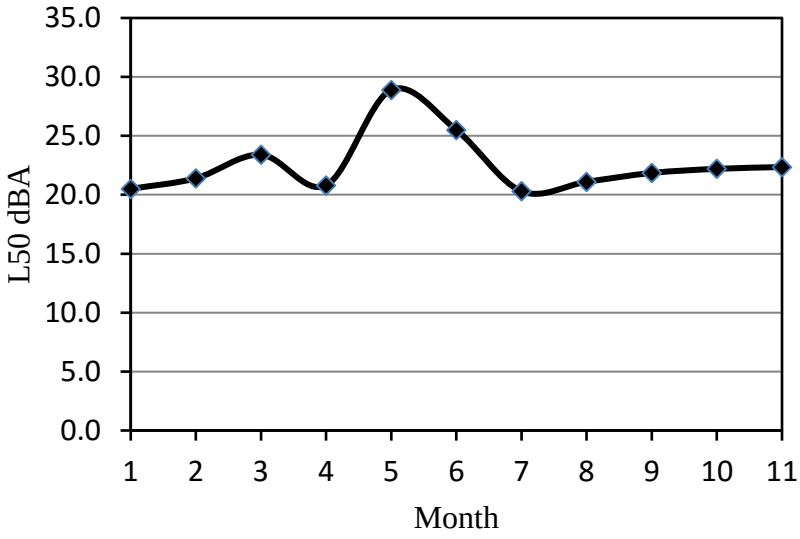

Figure 1. Monthly L50 dBA sound levels near Fern Lake, northwest WY, Jan-Nov 2006.

3.8 Recreation

All planning area land is privately-owned surface, so recreation on those lands is not under public lands management. The planning area is surrounded by USFS, a state section, and private property.

Bridger-Teton National Forest-managed lands are of national significance for recreation. The forest provides a large part of the region's recreation resource, which is also shared by other federal agencies, the state and the private sector. Approximately 1.3 million acres are designated wilderness on the forest with considerable roadless backcountry, which offers far less crowding and development than some of the trail corridors within designated wilderness, but also with limited access.

These largely roadless areas are sought by a significant segment of recreationists, provide relatively undisturbed habitat for wildlife, and offer outstanding opportunities for such popular activities as big game hunting, horsepacking, hiking into remote areas, and winter sports.

High levels of recreation use occur in the general vicinity. The northern portion of the forest is influenced by tourism associated with Grand Teton and Yellowstone national parks, while the east side of the forest is dominated by the Wind River Range, which draws a large number of dispersed recreationists from across the nation as well as international visitors. The Bridger Wilderness is the primary attraction to consumptive (e.g., hunters, anglers) and non-consumptive (e.g., hikers, campers, backcountry horse enthusiasts, outdoor photographers) users, although the large lakes

along the range front and the Upper Green River are also major recreation destinations (USFS, 2010, p. 3-100 – 3-105).

The public lands near the planning area have seen increasing recreational use in the past decade. Big game hunters, weekend campers, trail users, and anglers come to this area from many parts of the U.S., attracted by natural settings with good road access. Increasing development of nearby private lands, including subdivisions, is also having an effect on the number of people seeking recreation experiences on limited public forest lands in the area with a decline to access to undeveloped areas. However, a number of conservation easements are established on some of the private lands in the area will prevent future subdivision and other development; thus, maintaining current land uses and landscapes in to the future, but without the grant of public access.

Trails on surrounding public lands are suitable for all-terrain vehicles (ATV), motorbike use and four-wheel-drive (4WD) vehicles. Snowmobile use on surrounding forest lands is also prevalent. Except in popular hunting locations early in the fall elk and deer seasons, recreationists seeking solitude have a very good chance of seeing few to no other parties on most of the trails (USFS, 2010, p. 3-105 – 3-109), although demand has increased over time.

3.9 Socioeconomics

3.9.1 Introduction

The Wyoming Range, the closest mountain range to the planning area, is an isolated string of peaks rising from sloping foothills and vast sagebrush plains (USFS, 2010, p. 3-131).

The Wyoming Range, as described by The Wilderness Society (2006), has the values that enrich the lifestyles of local residents and provide a wide variety of recreation experiences that include free-roaming big game, native trout, healthy forests, pure water, alpine scenery, and solitude. The Wyoming Range is extremely important to hunters, outfitters, and guides, with close to 12,000 big game hunting licenses issued, more than 50,000 hunter-days spent in the area, and an economic return from hunting estimated to be more than four million dollars in 2004 (USFS, 2010, p. 3-131).

The Sublette County Comprehensive Plan (Sublette County, 2003, p. 4; 46) describes the area which includes the planning area as having clean air and water, vast open spaces, rich natural resources, accessible public lands, private property, and dramatic beauty.

Historic social and economic resources in the area are based on ranching, recreation, and mineral extraction including oil and gas exploration and production. Oil and gas have played a significant role in the regional economy since the 1920s. The area has experienced several boom and bust cycles and has realized an increased population tied to this industry. Tourism is also an important component of the economic base in Sublette County (USFS, 2010, p. 3-131).

While the planning area is made up of split-estate private ranchlands, two residential properties are within the planning area boundary, as are several residential subdivisions with a rough estimate of 35 houses within two miles of the planning area.

3.9.2 Demographics

Sublette County has had significant changes in population between 1990 and 2012.

The population of Sublette County increased by 12.4 percent between 2000 and 2004 (USFS, 2010, p. 3-132).

Between 1990 and 2007, the population of Sublette County grew at a considerably higher rate than the state, increasing by nearly 35 percent. Most of the growth occurred in unincorporated areas of the county, although Pinedale, located southeast of the planning area, increased in population by almost 73 percent between 1990 and 2007 (USFS, 2010, p. 3-132). The 2013 estimate of county population was 10,041 (U.S. Census Bureau, 2014) and 9,899 in July 2015 (U.S. Census Bureau, 2016) following a downturn in the domestic energy markets.

3.9.3 Employment, Income, and Revenue

The mining sector, which includes oil and gas development and other minerals mining, is a primary source of employment in Sublette County, which consists primarily of natural gas development in the county. Total employment in Sublette County in 2014 was 7,475 jobs, with over twenty percent of the jobs in the mining and oil/gas extraction industries (U.S. Bureau of Economic Analysis, 2015).

The leasing and development of federal fluid minerals supports local employment and income and generates public revenue for surrounding communities. The level of economic contributions from federal fluid minerals are largely influenced by the number of acres leased and estimated levels of production and can be measured in terms of the jobs, income, and public revenue it generates. Competitive federal oil and gas leases generate a one-time lease "bonus" bid as well as annual rents. The minimum lease bonus bid is $2.00 per acre. If no bonus bids are received, the parcels are later made available as noncompetitive leases where no bonus bids are collected. Lease rental is $1.50 per acre per year for the first five years and $2.00 per acre per year thereafter. Typically, oil and gas leases expire after 10 years unless held by production. Annual lease rentals continue until one or more wells are drilled that result in production and associated royalties. A portion of the revenues collected by the federal government is distributed to the state and counties. The amount that is distributed is determined by the federal authority under which the federal minerals are being managed. In 2016, federal lease parcels in Wyoming have been auctioned off with high bids ranging from $33.00 to $2,100 per acre.

According to "Your Tax Dollars at Work: A Guide to the Sublette County Budget 2014-2015," the minerals industry (including oil and gas) accounts for 96 percent of the county's total tax valuation of $3.4 billion dollars (Sublette Board of County Commissioners, 2015). Residential properties equal three percent of the total county tax valuation, commercial properties equal less than one percent, agriculture properties are 0.3 percent and utilities equal about 0.23 percent. Additionally, oil and natural gas production in Sublette County has generated substantial revenues for the U.S. Treasury, the state of Wyoming, and Sublette County; the distribution of these revenues varies, but is generally shared, with considerable support going to schools and roads (USFS, 2010, p. 3-134 – 3-135). Based upon accounting year data, the Office of Natural Resources Revenue reported revenue collected by the U.S. Treasury associated with federal oil and gas leases in Sublette County to be over $300,000 in rent revenue and over $340 million in royalty revenue in federal fiscal year 2015 (U.S. EITI 2016).

3.10 Soil Resources

The United States Department of Agriculture-Natural Resource Conservation Service (USDA-NRCS) provided a Sublette County 3rd Order soil map and database (updated in 2013) that included soil map units (delineated polygons based on soil biological, chemical and physical properties). Soil map units in Table 3-4 and Map 5 are within one mile of the RMP amendment area.

Landscape positions for soils range from floodplains to mountains (see landforms in NRCS Map Unit Descriptions, Appendix C). Lands with wind erodibility index (WEI) values above 8 are considered highly erodible. All mapped soils in the planning area are in this category. The WEI is the potential erodiblity divided by tolerable soil loss. This RMP amendment area would exist within an area defined as having highly erodible lands, calculated from the WEI.

3.11 Vegetation

The dominant vegetation types found in the proposed amendment area include sagebrush/steppe and grasslands. Ridges with intermixed conifers and aspen, rocky ridgelines with mountain shrubs and riparian areas also occur. The sagebrush communities comprised Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and the grasses present in the area include Sandberg's bluegrass (*Poa secunda*), thickspike wheatgrass (*Elymus lanceolatus*), Indian ricegrass (*Achnatherum hymenoides*), needle-and-thread (*Hesperostipa comata*), green needlegrass (*Nassella viridula*) and squirreltail (*Elymus elymoides*). Mountain shrubs include mountain mahogany (*Cercocarpus montanus*), snowberry (*Symphoricarpos* spp. and serviceberry (*Amelanchier alnifolia*).

Table 3-4. A brief description for the soil map units located in the planning area.

Soil Map Unit[¥α]	Soil Depth[†]	Drainage[‡] Class	Percent Slope	WEI[€]	T Factor[£]	Hydrologic Soil Group(s)*	Rutting Potential**	Restoration Potential**	Soil Compaction Resistance
202	~1.5 m	W	0 to 30	48 to 56	5	C	Severe	High	Low
203	~1.5 m	W	10 to 45	48 to 56	3 to 5	C	Severe	High	Low
303	~1.5 m	W	10 to 50	48	3 to 4	C	Severe	High	Low
432	~1.5 m	W	0 to 30	48 to 56	3 to 5	C	Severe	High	Low
1109	>1.5 m	SWP	0 to 4	56	5	C	Severe	High	Moderate
1112	>1.5 m	VP	0 to 3	56	4	B/D	Severe	High	Low
2114	>1.5 m	SWP to VP	0 to 2	48	3	B/D	Severe	High	Low
2235	2116	>1.5 m	VP	0 to 2	56	4	B/D	Severe	High
2236	>1.5 m	SWP	1 to 4	56	3 to 4	C to B/D	Severe	High	Low
2404	>1.5 m	W	2 to 12	56	4	C	Severe	High	Low
5327	>1.5 m	W	2 to 12	86	3	A	Moderate	High	Low
5329	>1.5 m	W to MW	3 to 15	56 to 86	3 to 5	B to D	Moderate	High	Low
5330	0.5 m to > 1.5 m	W to SWE	4 to 20	48 to 86	3 to 5	B to C	Severe	High	Low
5525	> 1.5 m	W	5 to 30	48 to 86	5	C to D	Severe	High	Low
5526	>1.5 m	W	4 to 25	86	5	A	Moderate	High	Moderate
5528	0.5 m to > 1.5 m	W to SWE	10 to 35	48 to 56	3 to 5	B to C	Severe	High	Low
5625	0.5 m to >1.5 m	W	8 to 30	48 to 86	3 to 5	B to D	Severe	High	Low

5626	**0.5 m to >1.5**	**W to SWE**	**15 to 40**	**48 to 86**	**3 to 5**	**B to C**	**Severe**	**High**	**Moderate**

¥ Soil map units are found in Appendix C
α Both analyzed soil map units have low resistance to compaction (taken from USDA-NRCS Web Soil Survey)
† Soil depth classes (from NRCS Chapter 3 of Soil Survey Manual: Very Shallow, <0.25 m; Shallow, 0.25 m to 0.5 m; Moderately Deep, 0.5 m to 1 m; Deep, 1.0 m to 1.5 m; Very deep >1.5 m
‡ NRCS drainage classes: VP = very poorly drained; SWP = somewhat poorly drained; MW = moderately well drained; W = well drained; SWE = somewhat excessively drained
€ Wind Erodibility Index £ Tolerable soil loss (tons per acre, per year)
* Runoff potential: A = low, B = moderately low, C = moderately high, D = high. From USDA-NRCS *Part 630 Hydrology National Engineering Handbook Chapter 7 Hydrologic Soil Groups*

Various forbs are present throughout the area including milkvetches (*Astragalus* spp.), Hood's phlox *(Phlox hoodii*), tapertip onion (*Allium acuminatum*), bird beak (*Cordylanthus ramosus*), and Indian paintbrushes (*Castilleja* spp.). The riparian areas have species of willows (*Salix* spp.), sedges (*Carex* spp.), rushes (*Juncus* spp.) and numerous other riparian grasses, forbs and shrubs. Since these are privately-owned surface lands, the presence of BLM designated regionally sensitive species or USFWS designated threatened and endangered species are unknown.

3.11.1 Forests/Woodlands

In forests, lodgepole pine (*Pinus contorta*), Douglas-fir (*Pseudotsuga menziesii*), and subalpine fir (*Abies lasiocarpa*) occur. Aspen (*Populus tremuloides*) stands are also found mixed with conifers.

There is not any information on clear cutting in the planning area, although a timber salvage sale may be conducted on adjacent forest service lands. No proposals or public scoping have occurred.

3.11.2 Noxious Weeds and Invasive Species

Executive Order (EO) 13112, "Invasive Species," was signed by President Clinton in 1999 to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause. Noxious weeds are defined in this EO as those "species whose introduction does or is likely to cause economic or environmental harm or harm to human health." Noxious weeds and other invasive species, when introduced to an area, are aggressive and often dominate natural communities. They are often able to establish following disturbance and are found along roads and fence lines and in heavily grazed areas.

The Wyoming Weed and Pest Control Act designates 26 plant species as noxious weeds in the state of Wyoming (Wyoming Weed and Pest Council, 2012). Ten of these have been mapped inside the planning area or in the immediate vicinity: Canada thistle (*Cirsium arvense*), common tansy (*Tanacetum vulgare*), hoary cress (*Cardaria draba* and *Cardaria pubescens*), houndstongue (*Cynoglossum officinale*), leafy spurge (*Euphorbia esula*), musk thistle (*Carduss nutans*), oxeye daisy (*Chrysanthemum leucanthemum*), perennial sowthistle (*Sonchus arvensis*), spotted knapweed (*Centaurea maculosa*), and yellow toadflax (*Linaria vulgaris*) (GYCC, 2010). Canada thistle has been observed invading the riparian corridor along Muddy Creek in the planning area (Simon, 2006). Sublette County declared noxious weeds present in the general area include cheatgrass (*Bromus tectorum*) and western water hemlock (*Cicuta douglasii*).

The presence of noxious and other invasive species on these private surface lands is unknown. Seeds that are carried in on the wind, or from vehicles, livestock, livestock feed, contaminated agricultural seed, and equipment moving in and out of the planning area may increase infestations.

3.11.3 Special Status Species

Plants listed as Endangered Species or Threatened Species are not known in the proposed amendment area, nor has their habitat been identified; however, one BLM listed sensitive species, meadow pussytoes (*Antennaria arcuata*), is found nearby to the east and southeast. Special Status Plant surveys have not been completed within the amendment area to determine if any populations of this species are present, but potential habitat occurs within the boundary and in the surrounding area based on published soil surveys and remote imaging.

3.12 Wetlands, Riparian Zones and Floodplains

Wetlands perform a variety of functions, including groundwater recharge, groundwater discharge, flood flow alteration and desynchronization, sediment stabilization, sediment and toxicant retention, nutrient removal and transformation, production export, fish and wildlife habitat, threatened and endangered species habitat, and aquatic biota diversity and abundance. Additionally, many wetlands have socially significant values such as uniqueness/heritage, recreation, aesthetics, and a variety of economic values (USFS, 2010, p. 3-65).

The planning area is entirely privately-owned surface and not under the management of the federal government. Based on published remote imaging (e.g., satellite photos, aerial photos), soil surveys and hydrological maps, the following hydrologic surface features occur in the planning area:

Palustrine Emergent (PEM). These are natural moist swales and seeps that are hydrologically associated with riverine wetlands and irrigation canals. Vegetation is generally herbaceous and includes sedges, bulrushes, redtop (*Agrostis gigantean*), field horsetail (*Equisetum arvense*), reed canarygrass (*Phalaris arundinacea*), and panicled aster (*Symphyotrichum lanceolatum*). Some shrubby species, such as sandbar willow (*Salix interior*) and yellow willow (*S. lutea*), occur.

Palustrine Scrub/Shrub (PSS). There are natural moist swales and seeps that are hydrologically associated with riverine wetlands and irrigation canals and are dominated by woody vegetation less than 20 feet tall. True shrubs, young trees, and trees and shrubs that are stunted because of environmental conditions occur. Vegetation is dominated by shrubs such as sandbar willow and yellow willow, but may contain herbaceous species such as sedges, bulrushes, redtop, and aster.

Table 3-5-lists functions and values likely to be provided by wetlands in the planning area.

Table 3-5 Wetland Functions and Values in Planning area (USFS, 2010, p. 3-65)

Function/Value	Function/Value Provided?	Notes
Groundwater Recharge and Discharge	Possible	Groundwater recharge and discharge rates unknown
Flood Flow Alteration and Desynchronization	Likely	Wetlands along stream floodplains
Sediment Stabilization	Likely	Herbaceous and woody wetland

Table 3-5 Wetland Functions and Values in Planning area (USFS, 2010, p. 3-65)

Function/Value	Function/Value Provided?	Notes
		vegetation stabilize sediments
Sediment and toxicant retention	Likely	Wetland plants trap sediments
Nutrient removal/transformation	Possible	Wetlands trap nutrient inputs from cattle grazing
Production Export	Possible	Adjacent streams may flush wetlands during spring runoff
Fish and Wildlife Habitat	Yes	Fish use wetlands during wet seasons; birds and amphibians use wetlands; riparian corridors provide habitat connectivity
Threatened and Endangered Species Habitat	No	No threatened or endangered species known to use wetlands within planning area
Aquatic Biota Diversity and Abundance	Likely	Likely greater diversity of aquatic plants; aquatic animal diversity may fluctuate seasonally with water and oxygen levels
Uniqueness and Heritage	No	Wetlands not unique in region
Recreation	Yes – Limited	Wetlands may provide limited fishing/hunting opportunities
Aesthetics	Yes – Limited	Limited aesthetic value due to remoteness/low user volume
Other economic values	Yes	Wetlands may be valuable for water and as a forage source for grazing cattle

3.12.1 Floodplains

Approximately 290 acres of land within the planning area are within the 100-year floodplains (Map 6). The condition of the floodplains and stability of stream banks in the planning area have not been documented.

3.13 Water Resources

The planning area, consisting of the eight square miles plus a one-mile buffer, is located within the Snake and Upper Green river basins of Wyoming (USFS, 2010, p. 3-22 – 3-36). The planning area includes the headwaters of both the Snake River (via Muddy Creek and the Hoback River) and tributaries of the Upper Green River (Middle Beaver Creek) (Map 7). The Snake River is part of the Columbia River drainage system that flows to the Pacific Ocean in Washington. The Upper Green River is part of the Colorado River drainage which flows to the Pacific Ocean in Mexico. The two basins are separated by the drainage divide called the South Rim or 'The Rim' in the planning area.

The planning area is structurally complex encompassing the area referred to as Overthrust Belt, which is characterized by extensive folding and faulting, with the potential for seismic activity.

3.13.1 Surface Water

The watersheds in the planning area basins are critical to the state of Wyoming, providing water for wildlife, fisheries, agriculture, light industry, and residential uses, as well as a variety of recreation activities, which contribute substantially to the tourism industry. Stream health and watershed condition can be affected by ground disturbance such as vegetation removal, soil disturbance, water diversions, and stream crossings. Soil erosion and increased runoff from disturbance may cause increased sedimentation to streams and loss of streambank stability. Available information for the entirely privately-owned surface planning area is in this EA.

The planning area receives approximately 19 to 21 inches of precipitation per year, primarily in the form of snow (WWDC, 2014).

The South Rim acts as the primary watershed boundary between the Snake River drainage and the Upper Green River drainage in the planning area (Map 7). The northwestern portion of the planning area is located in the headwaters of the Snake River in the Muddy Creek/Hoback River 12th level hydrologic unit code (HUC) or subwatershed (#17040130303). The rest of the planning area is located in the headwaters of the Middle Beaver Creek 12th level HUC (#140401010401) (Map 5).

Snake River Basin. The headwaters of Muddy Creek are located near the planning area. Muddy Creek joins the Hoback River downstream of the confluence with Fisherman Creek in the NE/4 of NE/4, Section 23, T37N, R113W. The Hoback River joins the Snake River at Hoback Junction, 12 miles south of Jackson, WY. The headwaters of Muddy Creek flow generally northwestward via tributaries to Muddy Creek. Several small ponds are located in meadows along the South Rim and are associated with minor tributaries at the headwaters.

A large pond is located in Section 23 at the confluence of minor tributaries at the headwaters of Muddy Creek. Small riparian areas and wetlands occur with all the minor tributaries and ponds at the headwaters of Muddy Creek.

The area includes no mapped springs (Map 7), however, satellite imagery indicates the area is marshy throughout, so unmapped springs are likely present along South Rim.

Upper Green River Basin. The Upper Green River watershed is bounded by the Wyoming Range to the west, the Gros Ventre Range to the northwest and the Wind River Range to the north. The headwaters to the Upper Green River are located in the Wind River Range upstream from Green River Lakes. Middle Beaver Creek, including North and South Forks, and Cow Gulch flow through the planning area (Map 7). Annie Draw, tributary to Pixley Creek, is located in the northwest corner of the planning area. Pixley Creek joins Middle Beaver Creek in Section 29, T36N, R112W. Middle Beaver Creek joins Beaver Creek in the NE/4 of NE/4 Section 10, T35N, R112W. Beaver Creek joins the Upper Green River just south of Warren Bridge along U.S. Highway 191.

South Beaver Creek flows easterly through the southern portion of the planning area and joins Beaver Creek in the NW/4 of SW/4 Section 18 approximately 8,600 feet from the confluence of Beaver Creek and the Green River approximately 2,400 feet south of Warren Bridge on U.S. U.S. Highway 191 (Map 7).

A gauging station in Beaver Creek, at the approximate location of the historical USGS gauging station, registered an instantaneous peak discharge of 175 cubic feet per second (cfs) with a peak mean daily discharge of 138 cfs from April 26 through August 8, 2013 (WWDC, 2014).

Wetlands occur throughout the tributaries, particularly along South Beaver Creek (Map 7). Mapped springs are noted on both sides of Middle Beaver Creek in the south half of Sec. 25 and along an unnamed tributary of Middle Beaver Creek in Section 30, T36N, R112W (Map 7). A spring called North Beaver Creek in the northeast corner of the planning area along Annie Draw is a tributary of Pixley Creek.

3.13.2 Groundwater and Hydrogeology

Groundwater resources include deep and shallow aquifers under confined and unconfined conditions. Site-specific groundwater data for the planning area and vicinity are limited. Existing information comes primarily from Wyoming State Engineer's Office water well records.

Previous research has indicated that the lands within the planning area serve as a local area of groundwater recharge. Research has indicated that the planning area serves as a groundwater recharge area for the Tertiary Aquifers of the Upper Green River Basin (Martin, L.J., U.S. Geological Survey, 1996, p. 20-21; p. 25. Geomatrix, 2008).

Due to the complexity of the stratigraphy in the planning area, ambiguity exists concerning groundwater flow directions and gradients that recharge the planning area. However surface stream patterns generally indicate generalized groundwater flow at the headwaters of both the Muddy Creek and Middle Beaver Creek drainages since groundwater flow direction often mimics surface topography (Maps 7 and 8).

In and near the planning area, near-surface groundwater occurs primarily in the Pass Peak Formation and unconsolidated Quaternary deposits (Map 8). The major groundwater-bearing formation is the Pass Peak Formation, a member of the Wasatch Formation, which consists of tan to yellow, poorly cemented, heavily stained with limonite, round, weathered, cross-bedded, and contorted quartzite conglomerate, which intertongues southward with sandstone and claystone. Sandstones of the Pass Peak Formation extend as far south as Daniel where they interfinger with red and gray variegated mudstones of the main unit of the Wasatch Formation (Steidtmann, 1969).

The Pass Peak Formation is thickest in the northernmost part of the area where approximately 1,900 feet of conglomerate are exposed. The depositional environment of the arkosic sandstone-conglomerate facies generally represents deposition by braided streams on an alluvial plain, while the sandstone-siltstone facies represents a typical floodplain sequence. These are cut by a complex series of eastwardly directed thrust faults. Where exposed at the surface, the coarse-grained units within the Pass Peak Formation represent aquifer recharge areas (Steidtmann, 1969). Groundwater

in the Wasatch Formation generally flows from recharge areas at the basin margins toward the center of the basins (Taboga *et al*., 2014, p. 7-149).

Other formations in the planning area include unconsolidated Quaternary alluvial deposits consisting of clay, silt, sand and gravel in floodplains, terraces, fans, terraces and slopes (Map 8). The Quaternary-age aquifers are located in the shallow subsurface, primarily near surface water features. Unconsolidated Quaternary aquifers are represented in the area primarily by alluvial deposits consisting of sand and gravel layers interbedded with silt and clay.

3.13.2.1 Groundwater Use: The Wyoming State Engineer's Office (WSEO) maintains records of all permitted wells in the area and information on water rights. There are 12 wells located within the planning area and within one mile of the planning area (Table 3-6):

Five water wells derive groundwater from the Pass Peak Formation while seven derive groundwater from Quaternary unconsolidated sediments, primarily along South Beaver Creek (Map 8). Five of the water wells are located on the same property, along Beaver Creek well permit numbers P12650P-52P, and P23532P-33P, noted in the table above.

Total depth of these water wells presumed to derive groundwater from the Pass Peak Formation range from 110 feet to 260 feet and yield from 8 to 25 gallons per minute (gpm). Those water wells located in the unconsolidated deposits range from 0 to 17 feet deep and yield from 2-20 gpm.

Hoback Ranches is located approximately two miles to the north of the planning area. There are 97 domestic or domestic/stock water wells associated with this subdivision ranging in depth from 0 to 640 feet; 36 water wells are presumed to yield groundwater from unconsolidated material and 61 water wells are presumed to yield groundwater from the Pass Peak Formation.

Of the water wells in the unconsolidated material total depths range from 0 to 20 feet and yield from 2 to 25 gpm. Of the water wells in the Pass Peak Formation, total depths range from 89 to 640 feet and yield from 2 to 25 gpm.

An additional 28 water wells are located in a subdivision approximately one mile southwest of the planning area. Of these 28 wells, 15 are presumed to yield groundwater from the unconsolidated material, with total depths ranging from 0 to 12 feet and yields from 2 to 25 gpm. Total depths of the 13 water wells that are presumed to yield from the Pass Peak Formation range from 50 to 500 feet in total depth and have reported yields of 2 to 25 gpm, based on available information. All water wells are used for domestic or domestic and stock purposes.

An industrial water supply well is located east of the planning area and was used to supply water for the drilling of an EOG Resources oil and gas well (Cow Gulch Federal 7-33), which was abandoned (Table 3-6). This 990-foot deep water well, owned by Williams Production Rocky Mountain Company, yields 80 gpm.

Portions of the planning area above South Rim are within the stream flow source area for the Eastern Snake River Plain Sole Source Aquifer (SSA), which is located in Eastern Idaho. EPA

designates Sole Source Aquifers as zones which supply at least 50 percent of the drinking water consumed in the area overlying the aquifer. EPA also stipulates that these areas can have no alternative drinking water sources which could physically, legally, and economically support those who depend on the aquifer for drinking water (EPA, 2010).

Additional reference at https://yosemite.epa.gov/r10/water.nsf/sole+source+aquifers/ssamaps , Eastern Snake River Plain Sole Source Aquifer map showing aquifer and source area.

The Wyoming Water Quality Rules and Regulations, Surface Water Standards classifies the Beaver Creek drainages, including Middle and South Beaver creeks, and Muddy Creek in the headwaters of the Snake River (Map 7), as Class 2AB streams. Class AB streams contain "waters known to support game fish populations or spawning and nursery areas at least seasonally and all their perennial tributaries and adjacent wetlands where a game fishery and drinking water use is other otherwise attainable …Unless it is shown otherwise, these waters are presumed to have sufficient water quality and quantity to support drinking water supplies and are protected for that use." Class 2AB waters also protect nongame fishes, fish consumption, aquatic life other than fish, contact and non-contact recreation, wildlife, industry, agriculture, and scenic value water uses.

According to Wyoming State Engineer records, none of the water wells within the planning area boundaries have been sampled for water quality. Of the 119 water wells in the vicinity of the planning area, 10 have had water quality analyzed. Water quality data is on file with county health departments. Of those, six are in the shallow unconsolidated material and four are in the Pass Peak Formation. The wells with water quality data are in Hoback Ranches, north of the planning area.

The chemical composition of Quaternary alluvial aquifers in the Green River and Hoback basins as characterized from one spring and eight of the analyzed water wells indicates that total dissolved solids (TDS) concentrations were less than or equal to 999 milligrams per liter (mg/L) with a median of 356 mg/L and considered suitable for most uses including domestic and stock.

TABLE 3-6 PERMITTED WATER WELLS IN THE PLANNING AREA

PERMIT NO	PRIORITY DATE	LOCATION Sec. T-R	QTR/QTR	USES	YIELD (gpm)	TD (feet)	SWL (feet)	ELEV (feet)	SWL ELEV (feet)	TD (feet)
P13925P	12/30/1947	4-35N-113W	NWSE	DOM	10	110	8	7793	7785	7683
P13926P	12/30/1947	4-35N-113W	NWSE	DOM	25	110	8	7793	7785	7683
P104334W	10/21/1996	4-35N-113W	NWSW	DOM	8	200	70	7852	7782	7652
P12650P	1/15/1967	4-35N-113W	NWSW	DOM	4	8	-1	7852	7853	7844
P12651P	6/30/1965	4-35N-113W	NWSW	DOM	4	4	-1	7852	7853	7848

P12652P	7/10/1966	4-35N-113W	NWSW	DOM	4	7	-1	7852	7853	7845
P23532P	12/31/1960	4-35N-113W	NWSW	DOM/STO	25	120	20	7852	7832	7732
P23533W	12/29/1972	4-35N-113W	NWSW	DOM	25	10	2	7852	7850	7842
P159871W	6/18/2004	5-35N-113W	SESE	DOM		0	0	7833	7833	7833
P30110W	6/6/1975	5-35N-113W	SESE	DOM	20	12	-4	7833	7837	7821
P107935W	10/28/1997	10-36N-113W	SWSE	DOM	2	17	-4	7295	7299	7278
P85812W	7/8/1991	11-36N-113W	SESW	DOM	10	260	40	7272	7232	7012
LOCATION: Section, Township, Range; QTR/QTR: Quarter/Quarter Section; TD: Total Depth; SWL: Static Water Level										
USES: DOM – Domestic, DOM/STO: Domestic and Stock gpm: gallons per minute										

No state or federal water-quality standards are exceeded in the records (Taboga *et al*., 2014, p. 7-129).

Water samples from two springs characterize the water quality and chemical composition of the Pass Peak Formation in the Green River and Hoback basins. TDS concentrations indicate that waters from both springs were fresh (less than 999 mg/L), ranging from 283 to 367 mg/L. The quality of groundwater from the Pass Peak Formation in the planning area and vicinity was considered suitable for most uses. No measures approached or exceeded applicable EPA or state domestic, agriculture, or livestock water quality standards (Taboga *et al*., 2014 p. 7-150).

3.14 Wildland Fire Hazards

Sagebrush and grass fuels that are present throughout the planning area can also present hazardous fuel conditions on slopes in late summer and fall. The mixed conifer fuel types will exhibit a high resistance to fire control and make the initial fire control attack difficult. Existing stand density on some slopes will enhance the possibility of a crown fire. In lodgepole pine stands, the lack of active management has allowed disease and insects, primarily with the mountain pine beetle. This situation has, in some cases, generated significant fuel loadings, which have created potential fire hazards that may ultimately compromise natural resource values and developments within the area.

The possibility of ignition in both lodgepole-mixed conifer and sagebrush-grass fuel types is high due to vehicular traffic on roads in the area and lightning strikes associated with summer thunderstorms. Numerous topographic features in the area, such as steep slopes, gullies, and aspect, will increase rates of spread and allow fires to "roll out" beneath firefighters or spot over roads. Grazing by large ungulates and fire suppression may have altered the composition and

overall coverage of stands capable of producing a grassy understory in which low-intensity fires occasionally occur (USFS, 2010, p. 3-71).

3.15 Wildlife and Fish

3.15.1 Big Game

3.15.1.1 Elk

The planning area contains two herd units, the Hoback and Piney herd units, managed by the Wyoming Game and Fish Department's (WGFD's) Jackson/Pinedale Region. Elk within these herd units receive supplemental feed in the winter. Herd units are defined as populations with less than 10 percent interchange with adjacent herd units. The elk population trend for these herd units has been slightly upward since 2010, and the total elk population is still above the objective level (WGFD, 2014).

The McNeel Elk Feedground is located near the confluence of Stub Creek and Muddy Creek, in the NE/4 of Section 26, T37N, R113W (USFS, 2010, p. 3-82; 3-90).

This area is identified as crucial/winter/yearlong/spring-summer habitats for elk.

3.15.1.2 Mule Deer

No mule deer winter range or parturition, or areas where the animals tend to give birth, areas are mapped within the planning area (WGFD, 2005). Mule deer population objectives for the Sublette Herd Unit are set at 32,000. The 2014 population estimate was 26,337. The population average from 2009 to 2013 was 22,715. The population is currently below objective, but has demonstrated an increasing trend since 2011 (WGFD, 2014).

The proposed amendment area is located within a population level migration route and subsequent stopover sites that mule deer use twice yearly while traversing through seasonal ranges. Sawyer *et al*. (2009) suggested that stopover sites may be more susceptible to human disturbance because they provide key foraging and resting habitat, which mule deer avoid if disturbed (Sawyer and Kauffman, 2009).

3.15.1.3 Moose

Surveys in the fall of 2008 detected moose in areas of relatively high elevation. Most moose locations were closely associated with riparian areas and forested habitat (Arcadis, 2008[b]; USFS, 2010, p. 3-92). The planning area contains crucial winter habitat for moose.

3.15.1.4 Pronghorn Antelope

No crucial pronghorn antelope winter range or fawning areas occur within the planning area.

The Sublette pronghorn antelope herd unit encompasses the Hoback and Beaver drainages, which extend into the planning area. This herd unit had an estimated population of 31,300 for 2014.

The population average within this herd unit was 45,560 from 2009 to 2013. The WGFD population objective for this herd unit is 48,000 pronghorn antelope (WGFD, 2010[a]).

The total pronghorn antelope population within this herd unit remains below objective with a decreasing population trend since 2010 (WGFD, 2014).

The planning area is inhabited by several big game species and contains suitable habitat for numerous Threatened and Endangered/Special (TES) Status Species (Table 3-7).

Table 3-7 Threatened and Endangered/Special Status Species (BLM Wyoming Sensitive Species List - https://www.blm.gov/wy/st/en/programs/Wildlife.html)

SPECIES	STATUS	HABITAT	PRESENCE/ABSENCE
Fish Bonytail, Colorado pikeminnow, humpback chub, razorback sucker	Federally Listed Endangered Species	Inhabit segments of the Colorado River System downstream of the planning area. Including: Green, Yampa and Colorado rivers.	These fish do not occur in any of the drainages within the planning area or in the vicinity of the planning area, but may be affected downstream by projects in the planning area that change water quantity and quality.
Fish Snake River fine-spotted cutthroat trout and Colorado River cutthroat trout, bluehead sucker	BLM Sensitive Species	The Snake and Hoback rivers and their tributaries. Beaver Creek drainage including South Beaver Creek. Upper Hoback River near the planning area.	Colorado River cutthroat trout known to occur in South Beaver Creek and Chall Creek (2005). Snake River fine-spotted cutthroat trout detected in Muddy Creek and the upper Hoback River, near the planning area. Bluehead sucker known to occur in the Hoback River near the planning area.
Canada lynx	Federally listed Threatened Species	Planning area includes a portion of the Middle Beaver Creek lynx analysis unit (LAU). The planning area is near designated Critical Habitat from Unit 5.	Canada lynx have been observed in the South Rim and Middle Beaver Creek, Beaver, Horse and Cottonwood Creek areas.
Gray wolf	Federally listed Threatened Species	The home range of the Rim Wolf Pack is known to overlap the planning area.	The Rim and Black Butte wolf packs are within roughly 10 miles of the planning area. Wolves are known to visit the area. USFWS classifies gray wolf in Wyoming as experimental, nonessential.

Grizzly bear	Federally listed Threatened Species	Planning area has potentially suitable habitat for grizzly bear.	Grizzly bear are known to visit the planning area, according to the WGFD.
Western yellow-billed cuckoo	Federally listed Threatened Species	Large tracts of deciduous riparian woodlands with dense, scrubby undergrowth. Western yellow-billed cuckoos frequently use willow thickets for nesting and forage in large cottonwoods (Bennett & Keinath, 2001). The planning area lacks large tracts of cottonwoods.	Given the lack of suitable habitat It is unlikely that the Western yellow-billed cuckoo inhabit the planning area. The downstream area along Horse Creek has suitable riparian habitat, but there are no recorded observations.
Greater Sage-Grouse	BLM Sensitive Species	There are three known leks within four miles of the planning area. No known winter concentration areas within the vicinity of the planning area.	There are three known leks within four miles of the planning area. The planning area is located within a General Habitat Management Area (GHMA) for Greater Sage-Grouse.
Long-billed curlew	BLM Sensitive Species	Long-billed curlew occur in a variety of grasslands communities, from shortgrass prairies to cultivated hay fields to sagebrush-grasslands.	The long-billed curlew is likely present, but not scientifically confirmed within the planning area.
Brewer's sparrow	BLM Sensitive Species	Prairie and foothill shrublands where sagebrush is present.	Brewer's sparrows occur in the vicinity of the planning area (USFS, 2010).
Bald eagle	BLM Sensitive Species	Habitat near water, nest sites usually near body of water; riparian areas.	No known active bald eagle nests or roosts in the planning area, but may incidentally use.
Boreal toad	BLM sensitive	Suitable habitat present within the planning area.	Present throughout the entire Beaver Creek watershed.

3.15.2 Native Fish

Buck Creek, Hay Gulch, Chall Creek, South Fork Chall Creek, North Fork of Beaver Creek, Middle Fork of Beaver Creek, Beaver Creek and South Beaver Creek are known to support native nongame fish species (WGFD, surveys-database) (Map 7).

3.15.2.1 Federally Listed Species of Fish

The endangered bonytail, Colorado pikeminnow, humpback chub, and razorback sucker inhabit reaches of the Colorado River system downstream of the planning area. These fishes are known from large mainstem rivers downstream of the planning area, including the Green River, Yampa River, and Colorado River. Suitable large riverine habitats for these fishes include eddies, pools, backwaters, and occasionally riffles.

None of these listed fishes are known to occur in any of the drainages within the planning area or in mainstem riverine habitats near the planning area. To date, critical habitat for these fish species has not been designated anywhere in Wyoming (Arcadis 2008[a]; USFS, 2010, p. 3-96). However, impacts to water quantity and quality in the planning area may have adverse effects to these listed species and their designated critical habitats downstream and are subject to a formal Section 7 ESA consultation between the BLM and U.S. Fish and Wildlife Service concerning oil and gas development and water consumption.

3.15.2.2 BLM Sensitive Species of Fish

BLM Sensitive fish species based on their habitat and known or potential occurrence in the planning area include the Snake River fine-spotted cutthroat trout and Colorado River cutthroat trout.

Cutthroat Trout (All Subspecies)

Cutthroat trout are found in relatively silt-free, cool, mountain streams. Cutthroat trout are out-competed and preyed on by other non-native trout species and can hybridize with rainbow trout or other cutthroat trout subspecies. They require cobble-pebble substrate and relatively moderate stream gradients to spawn.

According to WGFD, the Colorado River cutthroat historically occupied Chall Creek and harbored a core conservation population until 2009. They also historically inhabited the Middle Fork and North Fork of Beaver Creek. Colorado River cutthroat trout occupied Chall Creek in the 1980s and 1990s. Colorado River cutthroat trout were not found in 2009 surveys. Habitat conditions (a sediment laden system) and drought, are suspected as impacting the trout population. Nongame fish are present.

Habitat for Snake River fine-spotted cutthroat trout (subspecies combined with Yellowstone cutthroat trout, a separate subspecies, by U.S. Fish and Wildlife Service) occurs in the Snake River, the Hoback River, and their tributaries. According to the WGFD, surveys during the summer of 2011 detected Snake River fine-spotted cutthroat trout in the Muddy Creek drainage near the planning area (Map 7).

The Colorado River cutthroat trout is known to inhabit the Beaver Creek drainage within the southern portion of the planning area (Map 7). Within this drainage, a core conservation population of Colorado River cutthroat is known to occur in South Beaver Creek (Neal, 2005).

Surveys in the fall of 2008 detected Snake River fine-spotted cutthroat trout in the upper Hoback River near the planning area (Arcadis 2008[a]; USFS, 2010, p. 3-96).

The bluehead sucker is also considered a Wyoming BLM Regionally Sensitive Species. Bluehead sucker are found in the Green River and the Snake River drainages in Wyoming. Introduced predatory fish are known to be a cause for the decline of the bluehead sucker, which are also known to be outcompeted by, and hybridize with, non-native suckers like white sucker (*Catostomus commersoni*). They are associated with hard substrates in a variety of aquatic habitat types. Bluehead sucker are documented in the upper Hoback River (WGFD, surveys-database).

3.15.3 Migratory Birds

Aspen, conifer forests and willow are preferred by many species of both resident and migratory birds, such as species of vireos, warblers, flycatchers, and Western tanagers. Aspen stands support a particularly high diversity of avian species, such as species of sapsuckers, flickers, swallows, juncos, and bluebirds. Sagebrush openings within the planning area are used by migratory shrub-steppe obligates, such as sage sparrow, sage thrasher, and Brewer's sparrow (Nicholoff, 2003).

Riparian areas make up a small amount of the planning area; however, because riparian areas appear to be vital to and frequently used by migratory birds, the area of analysis for migratory birds is the suitable montane riparian habitat in the planning area. Montane riparian habitats are typically dominated by willows, alder, dogwood, Rocky Mountain maple, and water birch, and can include narrowleaf cottonwood, spruce, sedges, and rushes at mid- to upper-elevations (USFS, 2006).

The diversity of structure and cover provides nesting habitat, hiding and thermal cover, and food (e.g., insects, seeds, nectar, and vegetation) for a variety of bird species. The water bodies provide a source of water and food for aerial insectivores. Montane riparian habitat is limited in the planning area, occurring primarily along Muddy Creek and its tributaries, and along Middle Beaver Creek.

The U.S. Fish and Wildlife Service has designations for conservation priorities. Level I (Conservation Action): Species clearly needs conservation action; Level II (Monitoring)**:** The action and focus for the species is monitoring. Declining population trend and habitat loss are not significant at this point. Level III (Local Interest): Species that Wyoming Partners In Flight may recommend for conservation action that are not otherwise high priority but are of local interest. Level IV (Not Considered Priority): Additional species of concern, but not considered a priority.

Nine Level I and II priority bird species are potentially associated with these montane riparian areas, including the calliope hummingbird, broad-tailed hummingbird, willow flycatcher, Hammond's flycatcher, American dipper, MacGillivray's warbler, Wilson's warbler, bald eagle, and harlequin duck (USFS, 2010, p. 3-83).

3.15.4 Special Status Wildlife Species (Threatened and Endangered Species)

Eight federally listed species: the Canada lynx, gray wolf, grizzly bear, Western yellow-billed cuckoo, bonytail chub, Colorado pikeminnow, humpback chub and razorback sucker, were

identified as potentially occurring in, or influenced by, the planning area (USFS, 2010, p. 3-83; USFWS, 2016) and subsequent development.

3.15.4.1 Canada Lynx

The historic range of Canada lynx extended from Alaska across much of Canada, with southern extensions into parts of the Western United States, the Great Lakes states, and New England (McKelvey *et al*., 1999; Ruediger *et al*., 2000). The USFWS listed the Canada lynx in March 2000 as threatened in the contiguous United States (USFWS, 2000). The distribution of Canada lynx is associated with the boreal forest and closely follows that of the snowshoe hare (Ruggiero *et al*., 1994; USFS, 2010, p. 3-83 – 3-84).

Snowshoe hare are the primary prey of Canada lynx, thus Canada lynx foraging habitat coincides with the dense understory shrub and sapling habitats used by snowshoe hare (Ruggiero *et al*., 1994). Canada lynx denning habitat is found in mature forests with high horizontal cover provided by coarse woody debris (Ruggiero *et al*., 1994; Ruediger *et al*., 2000). Suitable travel corridors consist of a closed canopy of coniferous or deciduous vegetation taller than six feet. Canada lynx avoid large openings where they cannot find snowshoe hare, stalk other prey, or stay hidden from larger predators (Ruggiero *et al*., 1994). The preferred habitat of the Canada lynx in the Western U.S. is the Rocky Mountain conifer forest dominated by lodgepole pine, subalpine fir, and Engelmann spruce at an elevation above 6,500 feet (McKelvey *et al*., 1999; Ruediger *et al*., 2000). In Wyoming, the majority of Canada lynx sightings have been in the northwestern and west-central parts of the state (USFWS, 2008[b]).

The WGFD and USFS as well as other parties have surveyed for Canada lynx in the western Wyoming mountains since the winter of 1995-96.

Canada lynx have been regularly observed in the South Rim and Middle Beaver Creek areas as well as Beaver, Horse and Cottonwood Creeks (Squires and Oakleaf, 2005; Berg *et al*., 2008; Squires *et.al*, 2003).

The planning area includes portion of the Middle Beaver Creek lynx analysis unit (LAU) (USFS, 2010, p. 3-79 – 3-84). The planning area is outside of designated Unit 5 Lynx Critical Habitat.

3.15.4.2 Gray Wolf

Gray wolf were historically present in the Greater Yellowstone Ecosystem (GYE), but were virtually extirpated from the Western United States by the 1930s (USFWS, 1994). In 1973, the northern Rocky Mountain wolf subspecies was listed as endangered (USFWS, 1973); in 1978 (USFWS, 1978), all gray wolf south of Canada (except those in Minnesota) were listed as endangered. In 1995 and 1996, gray wolf were reintroduced into the GYE. Concurrent with reintroduction, the status of the gray wolf within the GYE was changed from endangered to threatened, nonessential experimental, under section 10j of the Endangered Species Act (ESA) (USFWS, 1994; USFS, 2010, p. 3-85).

In 2008 USFWS issued a final rule delisting the gray wolf in several states including Wyoming, portions of Montana and Idaho. A series of lawsuits and legal rulings ensued, effectively relisting the gray wolf.

The gray wolf remains federally listed under ESA as threatened in Wyoming because the state management plan was determined to be inadequate in ensuring that wolf populations remain recovered under state management (USFS, 2010, p. 3-85 – 3-86).

At the end of 2009, at least 320 wolves in at least 44 packs lived in Wyoming (Jimenez *et al*., 2010). At least 1,645 gray wolf existed overall in the northern Rocky Mountains at the end of 2008 (USFWS *et al*., 2009; USFS, 2010, p. 3-86). At least 195 gray wolf in 34 packs inhabited Wyoming outside Yellowstone and the Wind River Reservation as of Sept. 23, 2014. Sixteen packs successfully reproduced and raised two pups of the year through Sept. 23, 2014, according to a Wyoming Game and Fish Department report (WGFD 2014). In Yellowstone National Park there are an additional 104 wolves in 11 packs plus an additional 10 wolves in one pack on the Wind River Reservation. According to the USFWS, there is a minimum of 1,800 gray wolf in the northern Rocky Mountains of Wyoming, Idaho and Montana in more than 300 packs (USFWS 2015).

Gray wolf are habitat generalists and use a variety of habitats including coniferous forest, montane meadow, and shrub steppe. Key components of suitable gray wolf habitat include a sufficient year-round prey base of ungulates and alternate prey, suitable and semi-secluded denning and rendezvous sites, and sufficient space with minimal exposure to humans (USFWS *et al*., 2009). Preferred gray wolf prey species of deer, elk and moose are all found within the planning area. Gray wolf den in late March or early April and are sensitive to human disturbance near active den sites (USFWS *et al*., 2009). Den sites are typically located in well-drained soils, on slopes less than 30 percent, and within 1,200 feet of surface water (USFS, 2010, p. 3-86).

Mapping in the Rocky Mountain Wolf Recovery Annual Reports (USFWS *et al*., 2009) indicates that two small gray wolf packs, the Rim Pack and the Black Butte Pack, occur within roughly 10 miles of the planning area. The home range of the Rim Pack is known to overlap the planning area (Jimenez *et al*., 2010). As of 2009, the Rim Pack consisted of four adults and two pups, and the Black Butte Pack consisted of one adult and two pups (Jimenez *et al*., 2010). The Black Butte Pack has been subject to multiple control actions due to livestock predation (Jimenez *et al*., 2010; USFS, 2010, p. 3-86) and more recently in 2015 and 2016.

3.15.4.3 Grizzly Bear

Historically, the range of the grizzly bear in North America extended from the Great Plains westward to the California coast and south into Texas and Mexico (USFWS, 1993). Grizzly bear are currently found on about two percent of their former range in the lower 48 states, in Wyoming, Montana, Idaho, and Washington (USFWS, 2007). This includes the GYE in northwestern Wyoming, southwestern Montana, and eastern Idaho. Grizzly bear are expanding their range south into the Gros Ventre Wilderness and Wind River ranges (Moody *et al*., 2002; USFS, 2010, p. 3-86) and according to the WGFD, into the Wyoming Range, close to the planning area.

Grizzly bear are omnivorous and opportunistic. They are able to survive in a variety of habitats and use a variety of food sources. Four major food sources of grizzly bear inhabiting the GYE are whitebark pine seeds, army cutworm moths, large ungulates, and spawning cutthroat trout (Moody *et al*., 2002). The most suitable grizzly bear habitat is in areas with large tracts of undisturbed habitat and minimal human disturbance (Moody *et al*., 2002). Such areas provide security for grizzly bear. In one study, the minimum daily area requirement for female grizzly bear was

determined to be nine square kilometers (2,224 acres); therefore, patches of habitat greater than nine square kilometers and greater than 500 meters (0.31 miles) from areas of high human use were defined as security areas (Gibeau *et al*., 2001; USFS, 2010, p. 3-86).

Grizzly bear denning habitat usually consists of forested slopes, especially with a north-facing aspect (USFS, 2005).

Current threats to grizzly bear include habitat loss and degradation due to rural or recreational development, road building, and energy and mineral exploration. This includes the destruction of important linkage habitats, or travel corridors, for grizzly bear in riparian areas and valley bottoms (USFWS, 2007; USFS, 2010, p. 3-86 – 3-87).

Grizzly bear need secure habitat – areas of habitat sufficient in size for grizzly bear to avoid humans – for population growth to occur (USFS, 2005). The biggest threat to grizzly bear is mortality caused by humans, such as accidental and defensive kills by hunters, vehicle collisions, and lethal removal of food-conditioned and livestock-preying grizzly bear that conflict with people (USFWS, 2007; USFS, 2010, p. 3-86 – 3-87).

The established outer boundary for grizzly bear occupancy encompasses most of the area within the Wyoming portion of the GYE. The planning area lies within the southern portion of the GYE. The USFS and WGFD consider grizzly bear common, north of the planning area, but they are not considered common in the planning area. The planning area is outside the Grizzly Bear Primary Conservation Area (PCA) and no Grizzly Bear Management Units are mapped for the area (Moody *et al*., 2002). The PCA is also the recovery zone for grizzly bear – "the area within which the population and habitat would be monitored to assess achievement of recovery and would be large enough and of sufficient habitat quality to support a recovered grizzly bear population" (USFS, 2005; USFS, 2010, p. 3-87).

3.15.4.4 Western Yellow-Billed Cuckoo

Western yellow-billed cuckoo are generally associated with large tracts of deciduous riparian woodlands with dense, scrubby undergrowth (Bennett & Keinath, 2001). Western yellow-billed cuckoo frequently use willow thickets for nesting and they forage among large cottonwoods in extensive riparian galleries. The planning area is outside of designated Western yellow-billed cuckoo critical habitat. There are no large tracts of cottonwoods within the planning area that therefore does not provide suitable habitat. Transient individuals may fly over the planning area seasonally, but these occurrences are unlikely, because of the lack of nesting and roosting habitat.

3.15.4.5 Greater Sage-Grouse

Greater Sage-Grouse range from Washington, Oregon, Idaho, Montana, North Dakota, eastern California, Nevada, Utah, western Colorado, South Dakota and Wyoming (USFWS, 2006[a]). In Wyoming, Greater Sage-Grouse are known as common nesting residents throughout the state where suitable habitat is available (USFS, 2010, p. 3-87).

Greater Sage-Grouse are sagebrush obligate species, meaning their distribution is strongly associated with the distribution of sagebrush habitat (Connelly *et al*., 2004). The relationship between sagebrush and Greater Sage-Grouse is closest during winter when the birds switch from a diet of insect, forbs, and sagebrush to one primarily composed of sagebrush (Doherty *et al*., 2008). Other habitats, including non-forested riparian areas, meadows, and shrublands, can provide brood

rearing and foraging habitats for Greater Sage-Grouse. Female Greater Sage-Grouse are known to nest and brood as far as 5.3 miles from leks, which are the sites where males gather in the early spring to display for potential mates (Bohne *et al*., 2007). Greater Sage-Grouse are typically restricted to elevations between 4,000 and 9,000 feet (USFWS, 2006[a]; USFS, 2010, p. 3-87).

Three known leks are located within four miles of the proposed RMP amendment area. The Cow Gulch Lek occurs approximately one mile southeast of the planning area, in state-managed Section 36. Birds on the lek were originally discovered in this general area in 2008, during aerial searches tied to PXP proposed development habitat assessments. The Tristan Bjorn and Beaver Ridge Greater Sage-Grouse leks occur approximately 3.5 miles to the south and southeast of the proposed amendment area. The planning area is located within designated Greater Sage-Grouse General Habitat Management Area (GHMA) and there is not any Greater Sage-Grouse Priority Habitat Management Area (PHMA) (formerly Greater Sage-Grouse Core Habitat) (BLM, 2015). There are no mapped Greater Sage-Grouse winter concentration areas within 10 miles of the proposed amendment area and approximately 20 miles to a much larger wintering area.

3.15.4.6 Bald Eagle

Bald eagle were listed as endangered species within Wyoming in 1967, and downgraded to threatened species in 1995. In July 2007, the U.S. Fish and Wildlife Service removed the bald eagle from the Federal List of Endangered and Threatened Wildlife in the lower 48 States; however, it is still protected under the Bald and Golden Eagle Protection Act. Bald eagle are closely associated with water, with nest sites commonly less than one mile from a lakeshore or riverbank. Large trees are necessary to support bald eagle nests, particularly cottonwoods and large conifer species. Nest trees are often the largest trees in the stand, providing easy access to the nest (USFWS, 2008[c]). Typically, alternate nests exist within or near the nest stand. Snags and open-canopied trees near the nest site and foraging areas provide favorable perch sites. The structural diversity and open canopies of old growth stands are important habitat components for bald eagle.

Bald eagle that have open water near their nesting territories will stay for the winter; other bald eagle migrate southward to open water and areas with available prey (USFWS, 2008[c]). The number of bald eagle pairs nesting in Wyoming has been steadily increasing since 1990 (USFWS, 2006[b]; WGFD, 2010[c]). Known active bald eagle nests do not occur in the planning area. However, potentially suitable riparian habitat exists, particularly along South Beaver Creek, within one mile of the planning area boundary, where bald eagle may nest or winter roost (USFS, 2010, p. E-28).

3.15.4.7 Long-Billed Curlew

Long-billed curlew can be found throughout most of Wyoming in suitable habitat. Long-billed curlew occurs in a variety of grasslands communities, from shortgrass prairies to cultivated hay fields to sagebrush-grasslands (Dark-Smiley and Keinath, 2004). Although once common in the state, the long-billed curlew is now considered uncommon in Wyoming and infrequent throughout the eastern shortgrass prairies (Dark-Smiley and Keinath, 2004). Breeding Bird Survey (BBS) data suggest a statistically significant (1966-2007) population decline in USFWS Region 6 and the Central BBS Region (Sauer *et al*., 2008). Seasonally, bird watchers have observed long-billed

curlew in the Upper Green River watershed, Upper Hoback River watershed, Beaver Creek, and near Daniel and Merna, Wyoming.

Populations in Wyoming are suspected to be stable to declining due to habitat loss. This species has high habitat specificity for its breeding, wintering, and foraging habitats (Dark-Smiley and Keinath, 2004). The greatest threat to this species on BLM-administered lands in Wyoming is habitat loss, degradation, and fragmentation due to urban and oil and gas development, climate change, and some invasive species infestations. Other threats are: disturbance during breeding season by excessive vehicle traffic, recreation, and grazing; and, nest destruction caused by the agricultural practice called "dragging" (Dark-Smiley and Keinath, 2004; Sedgwick, 2006). Since specialized ecological refugia are threatened on BLM-administered lands, long-billed curlew is thereby designated as a Regionally Sensitive Species by the BLM in Wyoming (BLM, 2010).

3.15.4.8 Brewer's Sparrow

Brewer's sparrow are neo-tropical migrants, meaning they summer in North America and winter in Central and South America. Brewer's sparrow inhabit prairie and foothill shrublands where sagebrush is present. They are common summer residents of suitable habitats in Wyoming. Brewer's sparrow is a sagebrush-obligate species, which nests in live sagebrush or on the ground at the base of a live sagebrush shrub (USFS, 2004[c]). They are particularly found where canopy height is less than five feet (WY Partners in Flight, 2003; Holmes and Johnson, 2005).

Opinions vary on optimum shrub canopy cover for Brewer's sparrow. Wyoming Partners in Flight (2003) identified 5 to 25 percent, whereas other research (e.g., Reynolds, 1981; Petersen and Best, 1985) indicates that >25 percent canopy cover is preferable and that canopy cover as low as 15 percent is fair. Based on Wilson (2005), contiguous big sagebrush patches that are hundreds to many thousands of acres are best, but patches down to roughly 100 acres also provide good habitat. While some patches less than 100 acres may also provide habitat for Brewer's sparrow, considerably smaller, isolated patches than this do not support sustainable populations. Brewer's sparrow were documented in the area of the current planning area during USFS work for their 2010 DEIS. According to the USFS DEIS, during 2009 monitoring, the Bridger-Teton National Forest, and a majority of the state of Wyoming, is mapped as Bird Conservation Region 10 (BCR), the Northern Rockies. Brewer's sparrow in this BCR were surveyed in the Pinedale BLM area. (USFS, 2010, p. 3-95).

3.15.4.9 Boreal Toad

According to the WGFD, the boreal toad is present throughout the entire Beaver Creek watershed. The area is one of the strongholds for this species. Extensive surveys have been completed by WGFD and the U.S. Forest Service in this watershed. Breeding sites are abundant throughout the entire watershed. All life stages of the Boreal toad have been observed in the watershed.

4.0 ENVIRONMENTAL EFFECTS

This chapter analyzes and discloses the known environmental impacts of the considered alternatives. An environmental effect is a change in the quality or quantity of a resource because of a modification in the existing environment because of project related activities. Impacts may be the primary result (direct effects) or secondary result (indirect effects) of an action.

Descriptions of potential impacts resulting from the considered alternatives are discussed in this chapter.

4.0.1 Assumptions

The 2008 Pinedale RMP's as amended (2015) Reasonably Foreseeable Development (RFD) estimation is 20 oil and gas wells per township and the planning area is in T36N. The planning area equals roughly a quarter of the township, therefore the RFD scenario for the 5,120 acre planning area equals five conventional oil and gas wells, assuming a proportional reduction in wells. Coalbed Natural Gas (CNG) wells are not included in the RFD estimate due to their weak economic feasibility in the Pinedale Field Office and their low likelihood of development.

The RFD for the NSO alternative projects that approximately five conventional oil or gas wells could be drilled, completed, and potentially produce from locations within one mile of the project boundary based on advances in technology including directional and horizontal drilling methods and refinements in hydraulic fracturing, which increased the economic and technical feasibility of reaching fluid minerals underlying the planning area from outside of it. The No Action alternative is similar in well numbers projected, but development and production would be from within the planning area.

4.1 Direct and Indirect Effects

Each section below discusses the impacts for each resource related to a specific alternative from Chapter 2.

4.1.1 Alternative I – No Action Alternative

Assumptions

BLM-permitted actions on split-estate lands would be subject to the same environmental standards required for federal surface lands (Appendix B). Exceptions to surface development restrictions could be granted in coordination with the surface owner and if the exception is in conformance with the 2008 Pinedale RMP as amended (2015).

4.1.1.1 Air Quality/Climate Change

No Action

With the No Action alternative, the 2008 Pinedale RMP as amended (2015) would not be amended and the lands would remain available under the conditions specified for Traditional Areas for leasing. Effects as disclosed in the 2008 Pinedale RMP as amended (2015) would remain the same (BLM, 2008[b], p. 4-6 – 4-7). The BLM would adhere to all updated regulations concerning this resource.

Components of air quality that could be affected include visibility, air pollutant concentration, and atmospheric deposition. Projected upward trends in population growth within the Pinedale RMP planning area create the potential for long-term additional increases in air pollutant emissions from all other resource management programs under all alternatives. At the project scale, the privately-owned ranches and homesteads within and near the planning area are less likely to experience as much population growth as other parts of the RMP planning area with many acres restricted under conservation easements and subdivisions with set minimal acreage.

Air emissions from combustion processes and construction activities would be produced from all activities associated with oil and gas development. Exploration, well development, production, and well abandonment and road closures would produce air emissions including PM, CO, NO_x, SO_2, and VOCs.

However, under the USEPA's imposed ozone non-attainment zone for the Upper Green River Basin and accompanying air inventories and general conformity analyses, Wyoming state rules and regulations (https://rules.wyo.gov/Search.aspx?mode=1), and with improved technology and BMPs for drilling including advanced engines for rigs, development of horizontal and directional drilling techniques, multi-well pads, replacement of pits with closed-loop drilling mud systems, reductions in gas flaring, and increased recycling of drilling and hydraulic fracturing fluids, there has been an amelioration of adverse air quality effects related to oil and gas development in the Pinedale RMP planning area including this 5,120-acre planning area. Therefore, the adverse effects to air quality for oil and gas development within the planning area would be expected to be lower for the No Action and other alternatives considered in this EA than predicted by the 2008 Pinedale RMP as amended (2015).

4.1.1.2 Cultural Resources

No Action

With the No Action alternative, the 2008 Pinedale RMP as amended (2015) would not be amended and would remain the same. Effects as disclosed in the 2008 Pinedale RMP as amended (2015) would remain the same (BLM, 2008[b], p. 4-10 – 4-15). The BLM would comply with all updated regulations concerning this resource.

The 2008 Pinedale RMP as amended assumes that there is a direct relationship between the frequency of human use in an area and the potential for cultural resources to be adversely affected. On the split-estate planning area, oil and gas development and production with Traditional Area for fluid minerals leasing would result in a marked increase in traffic with heavy equipment as well as other vehicles from the existing ranching and residential land uses.

Because the planning area's surface lands are in private hands, the BLM does not have cultural resources inventories, so the resources are not well known, but may still be at risk.

4.1.1.3 Hazardous and Solid Wastes

No Action

Under the No Action alternative, the 2008 Pinedale RMP as amended (2015) would remain the same and effects from hazardous and solid wastes on multiple resources would remain as they are analyzed in the 2008 Pinedale RMP as amended (2015). The BLM would adhere to all updated regulations (BLM, 2007, p. 1-20) concerning these regulated materials that would affect multiple resources.

4.1.1.4 Livestock Grazing (Rangeland Resources)

No Action

Under the No Action alternative, the 2008 Pinedale RMP as amended (2015) would remain the same and effects would remain as they are analyzed in the 2008 Pinedale RMP (BLM, 2008[b], p.

4-39 – 4-48) as amended (2015). The BLM would adhere to all updated regulations concerning the rangeland resources and their use by livestock grazing.

Oil and gas leasing with subsequent development and production under the Traditional Area for fluid mineral leasing classification for the planning area would result in disturbances to soils, vegetation, water quality, and in some cases, access for livestock and potentially increased risk for vehicle collisions. While fluid minerals development and production are considered temporary uses by the BLM to be followed by Interim and Final Reclamation including recontouring to the natural landforms, the lives of well pads and producing wells are relatively long, approximately 50 years.

However, because the planning area is on split-estate with privately-owned surface lands, the BLM does not inventory or regulate those grazing and rangeland resources on the project ranchlands. If oil and gas are developed and produce within the planning area, there will be decisions among the landowner, the livestock operators, and the Operators on what lands are available for livestock grazing and which are restricted, as well as what seed mixtures are used for Interim and Final reclamations. The site-specific decisions will determine the effects this alternative have on rangeland resources. Note, Interim and Final Reclamation is not necessarily restoration to existing plant communities, and in some cases, may result in a healthier natural plant community and/or higher stock capacity with higher value and greater biomass of forage plants.

4.1.1.5 Mineral Resources

No Action

Under the No Action alternative, the lands would continue to be managed as a Traditional Area for fluid minerals leasing, and effects would remain as they are analyzed in the 2008 Pinedale RMP (BLM, 2008[b], p. 4-49 – 4-94) as amended (2015). The 2008 Pinedale RMP as amended (2015) Reasonably Foreseeable Development (RFD) estimation is 20 oil and gas wells per township. The planning area is in T36N, R113W, Sections 22-27, 34, and 35. The planning area equals roughly a quarter of the township, therefore the RFD scenario for the 5,120 acre planning area is approximately five oil or gas wells.

The 5,120 acres of the planning area would remain available for minerals leasing as allowable by the 2008 Pinedale RMP as amended (2015) and BLM laws, regulation and policies. The BLM would adhere to all updated regulations concerning the fluid minerals resource.

Effects of fluid mineral federal estate leasing with subsequent oil and gas development and production on split-estate acreage like the planning area varies and is based on site-specific conditions and APD-specific proposals, but affects several resources. Resource effects discussed in the 2008 Pinedale RMP as amended (2015) include the following resources: livestock grazing-rangeland, wildlife, air quality, surface water quality and quantity, groundwater quality and quantity, soils, viewsheds, soundscapes, recreation, cultural, paleontological, socioeconomics, vegetation, wetlands, riparian areas, forests (timber), and minerals.

Fluid minerals that are leased, explored, developed, and put into production within the planning area would lead to an irreversible and irretrievable depletion of reserves. The environmentally sound and legal disposal of produced water, drilling fluids, and well completion hydraulic

fracturing fluids to licensed and permitted disposal wells, wastewater treatment plants, and/or disposal pits would place minimal risks to soils, groundwater, surface water, air quality, vegetation, wildlife, livestock, and recreationists if BMPs and other safeguards are adhered to. Potential flaring of excess natural gas during drilling and completion would adversely affect air quality, but would be short in duration, less in quantity with industry technological advances, and would prevent more dangerous and heavily polluting wellhead blow-outs and other accidental spills and environmental releases.

Federal leasing, within the planning area, but absent of oil and gas development and production, would reduce effects to resources as described in the 2008 Pinedale RMP as amended (2015), and without an irreversible and irretrievable depletion of the federal fluid mineral reserves.

4.1.1.6 Noise

No Action

Under the No Action alternative, effects from noise on the natural soundscape would be similar to current estimates from development activities as noted in *Sound Levels Greater Sage-grouse Leks, Pinedale Anticline Project Area, Wyoming, April 2013* (Ambrose and Florian, 2013), a study conducted for the WGFD. For instance a Jonah Field compressor station at 140 meters away creates the noise measurement of L50.9. Noise measurements from a 21-natural gas well pad equal L44.4 from the distance of 200 meters. The BLM would adhere to all updated regulations concerning the effects of anthropogenic noise at the landscape level on the natural soundscape.

Increases in anthropogenic noise associated with oil and gas development and production would adversely affect recreation, wildlife, cultural, socioeconomics, and potentially livestock grazing and rangeland resources. BMPs requiring noise reduction for fluid mineral development and production to benefit Greater Sage-Grouse and other wildlife would help reduce effects to resources in and near the planning area as well to nearby residences and would be incorporated into the enforceable APDs with attached Conditions of Approval (COAs) or design features.

4.1.1.7 Recreation

No Action

Under the No Action alternative, the 2008 Pinedale RMP as amended (2015) would remain the same and effects would remain as they are analyzed in the 2008 Pinedale RMP as amended (2015)**.** Since the planning area is split-estate, the BLM does not have jurisdiction over recreational activities on these lands. The availability and issuing of federal oil and gas leases for split-estate lands does not produce direct effects to recreational use of public land. However, oil and gas development could indirectly affect recreational activities in the general area through increases in traffic, noise, dust, air and light pollution among others, and could limit the use of the private lands for recreational pursuits. All oil and gas operations on split-estate lands are subject to a surface access agreement and bonding, as necessary. The BLM would adhere to all updated regulations concerning this resource.

4.1.1.8 Socioeconomics

No Action

With the No Action alternative, the 2008 Pinedale RMP as amended (2015) would not be further amended and would remain the same. Effects as disclosed in the 2008 Pinedale RMP as amended

(2015) would remain the same (BLM, 2008[b], p. 4-113 – 4-160). The BLM would adhere to all updated regulations concerning this resource.

Under the No Action alternative with the planning area remaining as a Traditional Area for fluid mineral leasing, local, state, and national effects to the economy with increased oil and gas production, maintaining or increasing job opportunities, tax revenues, and royalties. There would be some local socioeconomic effects associated with oil and gas development and production with increased nuisances (e.g., odor, noise, light pollution, dust), possibly lower property values, and loss of the conservation easement investment of about half of the planning area acreage since the subsurface mineral estate trumps surface rights on split-estate lands and the right to develop and produce oil and gas from valid fluid mineral rights can be forced (aka "push orders).

4.1.1.9 Soil Resources

No Action

With the No Action alternative, the 2008 Pinedale RMP as amended (2015) would not be further amended and would remain the same. Effects as disclosed in the 2008 Pinedale RMP as amended (2015), with these lands available for oil and gas leasing and development, would remain the same (BLM, 2008[b], p. 4-161 – 4-168). The BLM would adhere to all updated regulations concerning this resource.

Soil-disturbing activities associated with fluid minerals development and production such as construction of well pads, access roads, and pipelines expose soils to the erosive forces of water and wind in both the short- and long-term. Effects to soils would be expected to be minimized and decline over time with successful Interim and Final reclamations, if the property owners within the planning area follow BLM recommendations and BMPs.

4.1.1.10 Vegetation

No Action

With the No Action alternative, the 2008 Pinedale RMP as amended (2015) would not be further amended and would remain the same. Effects as disclosed in the 2008 Pinedale RMP as amended (2015) would remain the same (BLM, 2008[b], p. 4-180 – 4-191). The BLM would adhere to all updated regulations concerning this resource.

Interim and Final reclamation on split-estate lands within the planning area from surface-disturbing effects associated with fluid minerals development and production could result in offsets or even improvements in vegetation, if the property owners and Operators would agree to BLM recommendations and BMPs. The surface use agreement between property owners and Operators would help determine the effects this alternative would have on vegetation. Possible reclamation and grazing solutions that would be seen to benefit livestock and forage production could be detrimental to wildlife and native plant communities, but cannot be predicted at this time and are site-specific.

4.1.1.10.1 Forests/Woodlands

No Action

With the No Action alternative, the 2008 Pinedale RMP as amended (2015) would not be further amended and would remain the same. Effects as disclosed in the 2008 Pinedale RMP as amended

(2015) would remain the same (BLM, 2008[b], p. 4-26 – 4-29). The BLM would adhere to all updated regulations concerning this resource.

Because the planning area is entirely split-estate lands, none of its forests are available for public permits for firewood, Christmas trees, posts and poles, and other timber products or under the influence of BLM regulations and management. However, improved access roads, if fluid mineral development and production occurs within the planning area, may also mean improved access to timber products for the property owners and their agents and accelerated and more extensive effects to the limited woodlands within the planning area.

4.1.1.10.2 Noxious Weeds and Invasive Species are addressed under various situations for the vegetation section of the *Proposed Pinedale RMP, Final EIS* (BLM, 2008[b], p. 4-154 – 4-167).

With the No Action alternative, the 2008 Pinedale RMP as amended (2015) would not be amended and would remain the same. Effects as disclosed in the 2008 Pinedale RMP as amended (2015) would remain the same. The BLM would adhere to all updated regulations concerning this resource.

With the continuation of the Traditional Area for fluid minerals leasing and with subsequent oil and gas development and production, there would be more infestations by an increased number of weed species covering larger areas of the planning area driven by increased heavy truck and other vehicle and equipment traffic and potentially contaminated reclamation seed mixes and mulches. Potential adverse effects, however, would be mitigated if BMPs and weed seed-free seed mixtures and mulches were adopted by the property owners and the Operators, as would be recommended by the BLM. While the BLM does not manage or regulate private surface acreage on split-estate lands like the entire planning area, it works with state and local weed managing groups and agencies, which cooperate with private landowners in Sublette County. The property owners and the Operators could include weed management and prevention in their negotiated Surface Use Agreement and the BLM would offer technical assistance.

4.1.1.10.3 Special Status Species (Plants)
No Action
Under the No Action alternative, the 2008 Pinedale RMP as amended (2015) would remain the same and effects would remain as they are analyzed in the 2008 Pinedale RMP as amended (2015) (BLM, 2008[b], p. 4-180 – 4-191). The BLM would adhere to all updated regulations concerning this resource.

Special Status Plant Species, such as meadow pussytoes found within the planning area, would be adversely affected by oil and gas development and production that would follow fluid mineral leasing because of associated surface disturbances such as construction of access roads, pipelines, and well pads that disrupt native plant communities and by their use and reclamation that could increase weed and other non-native plant problems. Adoption by the Operators and the private landowners into the negotiated Surface Use Plan for these split-estate lands of BLM BMPs and COAs that minimize oil and gas effects on native plant communities would reduce risks to meadow pussytoes and other Special Status Plant Species within and near the planning area.

While fluid mineral leasing with subsequent oil and gas development and production may result in short-term loses to native plant communities including Special Status Plant Species like meadow pussytoes, in the long term, there would be net gains to meadow pussytoes and to other Special Status Plant Species since Interim and Final Reclamation could be based on Ecological Site Descriptions within the planning area and result in increased biodiversity and ecologically functioning ecosystems that support them.

4.1.1.11 Wetlands, Riparian Zones and Floodplains

No Action

Under the No Action alternative, the 2008 Pinedale RMP as amended (2015) would remain the same and effects would remain as they are analyzed in the 2008 Pinedale RMP as amended (2015) (BLM, 2008[b], p. 4-180 – 4-191). The 5,120 acres of the planning area would remain available for minerals leasing as allowable by the 2008 Pinedale RMP as amended (2015) and BLM laws, regulation and policies. The BLM would adhere to all updated regulations concerning this resource.

Sensitive ecosystems within the planning area including wetlands, riparian zones, and floodplains are not often protected on split-estate acreage like the planning area unless the Operators and private landowners are willing to include conservation restrictions in their negotiated Surface Use Plan. However, since about half of lands within the planning area are protected by Conservation Agreements, these split-estate acres are more likely to remain protected in a negotiated Surface Use Plan as recommended by the BLM. However, since the subsurface federal mineral estate is superior in rights to the private surface in split-estate lands like the planning area, if a negotiated Surface Use Plan cannot be reaches, the Operators of successful leasing could "push" orders that place wetlands, riparian zones, and floodplains at risk. Within the planning area, including the conservation of wetlands, riparian areas, and floodplains, the BLM plays only an advisory role for surface management, while regulating oil and gas production and the depletion of subsurface fluid mineral reserves.

4.1.1.12 Water Resources

4.1.1.12.1 Surface Water

No Action

Under the No Action alternative, the 2008 Pinedale RMP as amended (2015) would remain the same and effects would remain as they are analyzed in the 2008 Pinedale RMP as amended (2015) (BLM, 2008[b], p. 4-198 – 4-206).

The 5,120 acres of the planning area would remain available for minerals leasing as allowable by the 2008 Pinedale RMP as amended (2015) and BLM laws, regulation and policies. The BLM would adhere to all updated regulations concerning this resource.

Increases in surface disturbance associated with oil and gas development and operations like constructing access roads, installing pipelines, and building well pads are predicted by the 2008 Pinedale RMP as amended (2015) to increase contaminated stormwater runoff, increase sediment loads via accelerated erosion with a compounding loss of the watersheds to buffer high flows, filter water and sediment and provide aquatic and riparian habitat.

There is a potential with fluid mineral leasing and subsequent development and production for there to be an increase in water and oil and gas well production wells, a decline in the water table, and decreased base flows to streams and springs. Downstream of the planning area, surface water declines are anticipated in the Green River-Colorado River Basins and the Snake River-Columbia River Basins, but are attenuated by reasonable and prudent measures, conservation recommendations, and mitigation funds associated with Section 7 ESA formal consultations and their accompanying Biological Assessments and Biological Opinions.

The potential for spills, leaks, and other undesirable events associated with the increase of use and storage of hazardous chemicals and petroleum products within the planning area and transported on and off it that is associated with oil and gas production places the water quality and its dependent biota at greater risks. BLM production and pipeline inspections and mandatory BMPs and COAs incorporated into the legally enforceable APDs on these split-estate lands would help reduce the risks and likely shorten the duration of environmental exposures from any undesirable events.

4.1.1.12.2 Groundwater

No Action

Groundwater resources can be affected by the depletion of aquifers tapped by local water users and adversely affected by poorly constructed wells that may admit or transmit contaminants into or between aquifers (BLM, 2008[b], p. 4-198 – 4-206; USFS, 2010, p. 3-31 – 3-35).

Under the No Action alternative, the 2008 Pinedale RMP as amended (2015) would remain the same and effects would remain as they are analyzed in the 2008 Pinedale RMP as amended (2015) (BLM, 2008[b], p. 4-198 – 4-206). The BLM would adhere to all updated regulations concerning this resource.

The 5,120 acres of the planning area would remain available for minerals leasing as allowable by the 2008 Pinedale RMP as amended (2015) and BLM laws, regulation and policies (Map 3).

Groundwater within and near the planning area would be adversely affected or at increased risks through industrial activities associated with developing and producing oil and gas such as groundwater withdrawals, injection, or mixing of material from different geologic layers or surface and the increased use and storage of larger quantities of hazardous and petroleum chemicals. The adverse effects to quantity and quality would be attenuated by BLM-required and legally-enforceable COAs and BMPS associated with APDs.

Groundwater quantity or yields, especially shallow aquifers, seeps, and alluvial aquifers would be affected, especially if siting access roads or pads covers or blocks surface and near-surface flows to groundwater recharge areas in or near the planning area. Proper siting with surface drainage and ground hydrogeology in mind would reduce or eliminate such adverse effects without hindering fluid minerals development and production.

4.1.1.13 Wildland Fire Hazards

No Action

With the No Action alternative, the 2008 Pinedale RMP as amended (2015) would not be further amended and would remain the same. Effects as disclosed in the 2008 Pinedale RMP as amended

(2015) would remain the same BLM, 2008[b], p. 4-208 – 4-212). The BLM would adhere to all updated regulations concerning this resource.

Fluid minerals leasing followed by oil and gas development and production would complicate wildfire suppression and fuels management in the planning area. Oil and gas development and production would introduce new ignition sources, barriers, and impediments to fire area and increased fire risk potential as a result of increased access and increased traffic, including during droughts and seasonal dry periods.

Response to wildfires and likelihood of early control would likely improve with fluid mineral development and production since there would be an increase in available workers as possible firefighters and fire spotters, and more emergency response equipment in and near the planning area than there would be with less roads and activity in this relatively remote split-estate acreage.

4.1.1.14 Wildlife and Fish Habitat

No Action

With the No Action alternative, the 2008 Pinedale RMP as amended (2015) would not be further amended and would remain the same. Effects as disclosed in the 2008 Pinedale RMP as amended would remain the same (BLM, 2008[b], p. 4-213 – 4-224). The BLM would adhere to all updated regulations concerning this resource. The 5,120 acres of the planning area would remain available for minerals leasing as allowable by the 2008 Pinedale RMP as amended (2015) and BLM laws, regulation and policies.

As acreages of surface disturbances and human activity levels within and near the planning area increase with fluid minerals leasing and oil and gas development and production, the quality and quantity of wildlife habitats likely will be reduced. Habitat fragmentation with the construction of utility lines, pipelines, access roads, and well pads would reduce suitable habitat and contiguous wildlife species ranges. Reductions in range with increased disturbance including noise, light, and odors would result in isolation of smaller, less mobile species, resulting in a loss of genetic integrity, lower biodiversity of ecosystems, and ecological shifts that may favor habitat generalists over specialists. Some species that are well-adapted for anthropogenic habitat changes like raptors and ravens that use artificial structures such as utility poles, storage tanks, and catwalks and ladders as feeding perches may thrive, potentially at the expense of their prey like white-tailed prairie dogs and pygmy rabbits.

Increased access through road development and increased traffic including heavy equipment and large tanker trucks would result in more human-wildlife conflicts and anticipated increases in wildlife mortality. Because the split-estate surface is managed between the Operators and the landowners, BLM would only be able to offer technical assistance and suggestions to minimize or mitigate effects to wildlife individuals, populations, their habitats, and their seasonal migration routes. Adverse effects are considered by the BLM to be short-term, perhaps 50 years for the life of the oil and gas wells, and Interim Reclamation and Final Reclamation often mitigates habitat losses and fragmentation. However, the negotiated Surface Use Plans between Operators and landowners, not mandatory COAs and BMPs from the BLM, will determine the site-specific and

planning area level effects of fluid minerals leasing, and oil and gas development and production, and those cannot be predicted at this time.

4.1.2 Alternative II – No Surface Occupancy (NSO)

Assumptions

When accessing federal minerals from off -lease locations, regardless of surface ownership, compliance with federal laws would still be required, including, but not limited to apply the Clean Air Act, the Clean Water Act, the National Historic and Preservation Act, and the Endangered Species Act.

Depending on the specific circumstances of future off-lease drilling and activities, best management practices and temporal or spatial restrictions to mitigate impacts to federal surface resources, would not be applied by the BLM to the non-federal surface locations and associated infrastructure. All activities associated with production of the wells would be regulated and monitored for compliance with federal regulations and statutes and subject to BLM inspections and enforcement.

The RFD for this alternative assumes that five conventional oil or gas wells could still be drilled and/or produced and that coal-bed methane wells will not be drilled in the planning area, based on market projections at the time of the drafting of this EA (August 2016).

4.1.2.1 Air Quality/Climate Change

No Surface Occupancy Alternative:

Ongoing oil and gas exploration and production activity near Pinedale and the surrounding area also have the potential to increase ambient levels of air pollutants in the vicinity of the planning area.

If the No Surface Occupancy Alternative is chosen, drilling could be allowed on private, state or other federally-owned surface properties outside of the planning area. The BLM does not have jurisdiction on private or state surface lands, however the drilling, completion, and production of oil and natural gas wells would still be a federal action requiring BLM authorizations for submitted APDs and Sundry Notices.

If drilling occurs, there likely would be an impact on air quality in the area similar to the No Action Alternative. The 2008 Pinedale RMP (BLM, 2008[a], p. 2-10 – 2-11) as amended (2015) addresses air quality issues, effects, and potential mitigation. Regional air quality is influenced by the interaction of meteorology, climate, the magnitude and spatial distribution of local and regional air pollutant sources, and the chemical properties of emitted air pollutants.

Air Resources include climate, climate change, air quality and AQRVs. Sources of emissions associated with the possible oil and gas development are analyzed in this environmental assessment.

Ongoing oil and gas exploration and production activity near Pinedale, WY and the surrounding area in the Upper Green River Basin ozone non-attainment zone also have the potential to increase ambient levels of air pollutants in the vicinity of the planning area.

Particulate matter is an air quality concern because of its potential to adversely impact respiratory systems. It can also reduce visibility, an air quality attribute in scenic areas. A wide variety of pollutants can impact visibility, including PM, NO_2, NO_3, and SO_4. Fine particles suspended in the atmosphere decrease visibility by blocking, reflecting, or absorbing light. Regional haze occurs when pollutants from widespread emission sources become mixed in the atmosphere and travel long distances.

4.1.2.1.1 Climate Change

No Surface Occupancy

Several activities that occur in PFO area may contribute to climate change, including: large wildfires, use of combustion engines, changes to the natural carbon cycle, changes to radioactive forces and reflectivity, and emissions of greenhouse gases (GHGs). GHGs, including carbon dioxide (CO_2), as well as methane (CH_4), nitrous oxide (N_2O), and fluorinated gases, are created and emitted through human activities, including oil and gas development, and agricultural activities. Without additional meteorological monitoring systems, it is difficult to determine spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

The assessment of GHG emissions and climate change is in its formative phase. It is currently not feasible to know with certainty the net effects from possible oil and gas development on climate. The inconsistency in results of scientific models used to predict climate change at the global scale coupled with the lack of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future effects of decisions made at this level.

When further information on the effects to climate change is known, such information would be incorporated into the BLM's planning and NEPA documents as appropriate.

GHGs would be emitted during the construction and drilling phase and throughout the life of the wells from production facilities, traffic, and occasional flaring. Flaring is anticipated to occur only in emergency situations. It is still unknown what the net direct or indirect effects the NSO Alternative would have on climate (BLM, 2008[b], p. 4-248 – 4-252).

4.1.2.2 Cultural Resources

No Surface Occupancy

Under the No Surface Occupancy alternative, access to federal fluid minerals would need to originate from lands surrounding the subsurface federal fluid minerals; private, state or other federally-managed surface properties outside of the planning area. In this case the BLM would need to conduct, or have conducted, Cultural Class III inventories in order to provide informed answers to questions involving Cultural Resources concerning the occupied and disturbed properties (see Federal Agency Responsibilities pertaining to Cultural Resources/Split Estates in Appendix B of this document).

Under this alternative, impacts would likely remain the same as they were analyzed in the 2008 Pinedale RMP as amended (2015). Since development could occur on surrounding state, private or USFS lands, Cultural Resources could be impacted as they are analyzed in the 2008 Pinedale RMP as amended (2015).

4.1.2.3 Hazardous and Solid Wastes

No Surface Occupancy

Fluid minerals extraction for the planning area fall under environmental regulations that address exploration, production, waste management and disposal practices. These regulations impose responsibility and liability for protection of human health and the environment from harmful waste management practices or discharges. Effects would be similar to the No Action Alternative, but would occur on non-BLM managed lands.

Adverse effects could be in the form of fluid spills, dry material or chemical spills, fuel spills, trash scatter on and off the well pads, and other hydrocarbon or gas releases.

4.1.2.4 Livestock Grazing (Rangeland Resources)

No Surface Occupancy

The planning area is comprised of split-estate lands with the surface property entirely privately owned. Effects would be similar to the No Action Alternative, but would occur on non-BLM surface lands.

The BLM does not have jurisdiction over livestock grazing on private lands in the planning area. The BLM does not have jurisdiction over non-BLM surface lands that are immediately adjacent to the planning area and that could be used to access federal fluid minerals directionally or horizontally. Offering, selling, and issuing federal oil and gas leases could produce effects to livestock grazing if private landowners or state land managers allow oil and gas development on their property. Subsequent development of a lease may generate effects to livestock, but would be addressed on a site-specific basis once the extent of development is known.

Oil and gas development on private or state lands could result in short-term and long-term losses of vegetation, which correlates to short-term and long-term losses of livestock forage. Short-term losses would occur until the portions of a well pad not needed for production operations, road disturbance outside the shoulders, and the pipeline disturbance are reclaimed with established vegetation. Long-term forage losses would be the portions of the pad needed for production operations for the life of the well, as well as the maintained portions of the access roads. Increased traffic associated with well-field development increases the possibility of animals being injured or killed in collisions with vehicles. All range improvements would be avoided by development to the extent practical.

4.1.2.5 Mineral Resources

No Surface Occupancy

There would be fewer impacts from fluid minerals leasing for the planning area since there would be no surface occupancy or surface development for oil and gas development and production within the planning area. Based on projections in the 2008 Pinedale RMP as amended (2015), there could be five wells directionally or horizontally drilled into the planning area from five separate pads located on private lands inside or private, state or other federally-owned surface properties outside of the planning area.

4.1.2.6 Noise

No Surface Occupancy
Anthropogenic noise effects are possible on the natural sound landscape, depending on the distance between the noise source and other resources being affected. Noise data is included in included in Appendix D *Sound Levels at Greater Sage-Grouse Leks, Pinedale Anticline Project Area, Wyoming* (Ambrose and Florian, 2013, p. 3-4).

4.1.2.7 Recreation
No Surface Occupancy
The act of offering, selling, and issuing federal oil and gas leases does not produce effects to the recreational use of public land. Subsequent development of a fluid minerals lease may generate effects to recreation activities. The quality of the recreational experience would likely be diminished by oil and gas development and production by landscape noise and scenic quality changes. Recreation on split estate lands would remain at the discretion of the private landowner and the usage data are not available.

Construction, drilling, completion, and production activities could cause large mammals and birds to move away from the planning area, which would diminish consumptive outdoor recreation like hunting as well as non-consumptive outdoor recreation such as wildlife watching and outdoor photography. Studies have shown that animals have moved two miles or more from logging operations and other similar activities. Studies also show that elk avoid areas within one to two miles of roads (Powell, 2003).

If development operations coincide with hunting seasons, hunters could experience reduced success rates within a two-mile area of the activity. It is also likely that some hunters would experience a diminished quality in their hunting adventure due to nuisance anthropogenic noise, lights, and odors related to oil and gas development and production including increased heavy truck traffic.

In addition to facilitating fluid mineral extraction, new oil and gas roads could provide better access to the fluid mineral lease areas for recreational opportunities, but can also result in increased trespass, poaching activities, vehicle-wildlife collisions, or wildlife harassment. However, the presence of oil and gas facilities would likely diminish the recreational experience and a decline in recreational use of an area due to oil and gas development would potentially affect local, state, and regional revenues generated through recreation. The amount of economic decline to the landowners, local business and communities, the county, and the state would depend on the type and level of use.

4.1.2.8 Socioeconomics
No Surface Occupancy
Under this alternative, oil and gas development of federal fluid minerals could occur with directional or horizontal drilling of a projected five wells from private, state or other federally-owned surface properties outside of the planning area.

For this planning area of 5,120 split-estate acres, a 10-year lease could provide a total of $89,600, in lease rental revenue and a one-time bonus bid amount of $10,240, a portion of which would be distributed back to the state and county from the BLM state office economist. It is likely that rent

would not be paid for the entire 10 years because of production occurring. Once production occurs, there would be revenue associated with federal mineral royalties, state severance taxes, and ad valorem taxes.

Future oil and gas development and production could impact future employment and labor income opportunities. However, this would be dependent upon actual development and production amounts. Under this alternative there could be an estimated 29 drilling and completion jobs in total for the five wells, based upon Table A26-1, column 'Other Wells in Planning Area' in Appendix 26 of the 2008 Pinedale RMP FEIS as amended (2015). There would also be the $1,912,638 in 2015 dollars of labor earnings associated with these drilling and completion jobs, based upon the aforementioned table (Table A26-1). Additional indirect or induced jobs and labor earnings would be created as discussed in Table 4-18 of the 2008 Pinedale RMP as amended (2015). The degree of change to employment and labor income is dependent upon the actual number of wells drilled, completed, and placed in production.

4.1.2.9 Soil Resources

No Surface Occupancy

Direct, indirect and cumulative soil effects would be similar to the No Action alternative, but adjacent rather than inside the planning area.

4.1.2.10 Vegetation

No Surface Occupancy Alternative

This alternative would have similar effects as the Unavailable Area for fluid minerals alternative throughout most of the interior of the planning area. With no disturbances due to leasing the native plant communities would continue to improve throughout most of the planning area. Where drilling may occur around the edge of the planning area there could be some indirect impacts due to fugitive dust in the air or increased sediment in streams. Also in this narrow edge area there is a greater possibility of encroachment by invasive weeds. This alternative would be an improvement for wildlife habitat except for isolated areas along the edge dependent on the amount of surface disturbance where effects would be the same as in the No Action Alternative.

4.1.2.10.1 Forests/Woodlands

This alternative would have similar effects as the Unavailable Area for fluid minerals alternative throughout most of the interior of the planning area. The health of the forests and woodlands would continue in their present state or improve due to less surface disturbance and a decrease of undesirable plant species throughout most of the area except for the margins of the planning area. These areas around the edge, where drilling may occur, may be affected by an increase in dust and stream sediment and have similar effects as in the No Action Alternative.

4.1.2.10.2 Noxious Weeds and Invasive Species

This alternative would have similar effects as the Unavailable Area for fluid minerals alternative throughout most of the interior of the planning area. With No Surface Occupancy, there would be less risk of invasion and spread by noxious weeds and other undesirable plant species in this interior area tied to oil and gas development and production. There would be similar effects as found in the No Action Alternative around the edge of the planning area where indirect effects from surface disturbing activities could occur inside the planning area. This edge area could see an

increase in weeds encroaching from the outside. With the continued use of Integrated Pest Management techniques the weeds would continue to decrease in the interior which would positively affect the native plant communities, while the edges may have fewer impacts from weeds than the No Action alternative, but would have more than the Unavailable Area for Leasing alternative. For private surface, as in the split-estate planning area, BLM has limited influence on non-native vegetation control and management, but Sublette County and the state of Wyoming, both of which cooperate with the BLM, still commands strong influence under local and state regulations and ordinances.

4.1.2.10.3 Special Status Species (Plants)

This alternative would have similar impacts as the Unavailable Area for fluid minerals alternative depending on the amount of surface disturbance surrounding the planning area. Where there is excess sediment in the air or streams this could impact the quality of the habitat for the meadow pussytoes within the planning area. The potential habitat for meadow pussytoes, a Wyoming BLM Regionally Sensitive Species, would be available for colonization and expansion of the nearby populations of this sensitive species unless it is degraded by activities occurring on private, state or other federally-owned surface properties outside of the planning area. These activities would produce effects similar to the No Action Alternative.

4.1.2.11 Wetlands, Riparian Zones and Floodplains

No Surface Occupancy Alternative

The likelihood of effects from oil and gas development and production on adjacent state or private lands increases if the BLM fluid mineral estate in the planning area was leased with a No Surface Occupancy stipulation. Some minimal effects to riparian areas or wetlands in the area are anticipated if oil and gas development and production occurs on adjacent state, private, or forest service lands, if runoff or sediment generated from those lands were to reach riparian areas or wetlands in or hydrologically-connected to the planning area (Maps 7 and 8).

4.1.2.12 Water Resources

4.1.2.12.1 Surface Water

No Surface Occupancy Alternative

The No Surface Occupancy Alternative would continue to allow oil and gas leasing for the 5,120 acre planning area, but would not allow access to the fluid minerals from the surface directly above the underground fluid mineral estate within the planning area. With this alternative, the only access to the subsurface fluid minerals would be from private, state or national forest service lands adjacent to the planning area.

To access the fluid minerals within the planning area under this alternative, directional or horizontal drilling and completions would be employed under the planning area from private or state surface managed lands along the east and south side of the property in the upper Green River Basin and along the north boundary of the property in the Snake River Basin. No effects to surface water would be anticipated on the property from drilling adjacent to the property, because effects would be directed downstream or down gradient from the property boundary, assuming that headcutting is prevented. The state and private sections would be downstream of surface streams within the planning area and in a different subwatershed (Map 7).

Effects to surface water and springs (Map 7) could occur downstream of the property due to soil erosion and increased surface runoff from surface disturbance for well pads and roads associated with oil and gas drilling activities. Spills or releases of hazardous materials could affect water quality in surface streams downstream of the drilling activity. However, all downstream effects would take place on private lands within the upper Green River Basin.

Effects could occur in Muddy Creek (Map 7) on U.S. Forest Service lands from increased surface runoff and increased soil erosion due to surface disturbance from well pads and roads associated with well drilling on private, state or other federally-owned surface properties outside of the planning area. Muddy Creek is a tributary of the Snake River.

4.1.2.12.2 Groundwater

Groundwater resources can be affected by the removal of groundwater from aquifers tapped by local water users and adversely affected by poorly constructed wells that may admit or transmit contaminants into or between aquifers (BLM, 2008[b], p. 4-198 – 4-206; USFS, 2010, p. 3-31 – 3-35).

Effects could occur to water wells downstream or gradient from the private or state property wells via improper construction of oil and gas wells from state, federal or private lands adjacent to the property (Map 8). No effects would be anticipated to either surface streams or groundwater within the planning area from the No Surface Occupancy alternative.

There are no effects to groundwater from wells south, east or north of the planning area. Effects would be in the case of improper construction and maintenance of oil and gas wells from federal, state or private lands adjacent to the planning area. Any drilling in these areas would be down gradient of the planning area. Effects could occur to water wells located downgradient of the drilling activities that would occur on private or state lands.

4.1.2.13 Wildland Fire Hazards

No Surface Occupancy

There would be similar effects in the No Surface Occupancy Action as in the Unavailable Area for fluid minerals alternative in relation to wildland fire hazards for the planning area since there would be no surface occupancy or surface development. However, if development occurs on the adjacent Wyoming state section, on adjacent U.S. Forest Service lands or on adjacent private property if it is used for directional and horizontal drilling to access federal minerals underneath the privately owned surface planning area, there is the potential for fires started by those developments to carry onto BLM administered land and private lands within the planning area.

4.1.2.14 Wildlife and Fish

4.1.2.14.1 Big Game

4.1.2.14.1.1 Elk

No Surface Occupancy

Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would still be a Traditional Area for fluid minerals leasing, directional and horizontal drilling technologies could allow for surface disturbance associated with development to occur

within adjacent forest service and private lands. Effects of this development on elk could include the loss and/or fragmentation of parturition habitat adjacent to the planning area dependent on the site-specific characteristics of potential well pads, access roads, utility lines, and pipelines.

4.1.2.14.1.2 Mule Deer

No Surface Occupancy

Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional and horizontal drilling surface disturbance associated with development could still occur within adjacent forest service and private lands. Effects to mule deer could include the disruption and/or fragmentation of seasonal migration routes that pass through the planning area and adjacent lands dependent on the site-specific characteristics of potential well pads, access roads, utility lines, and pipelines.

4.1.2.14.1.3 Moose

No Surface Occupancy

Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional and horizontal drilling surface disturbance associated with development could still occur within adjacent forest service and private lands. Effects to moose could include the loss and/or fragmentation of riparian and forested seasonal habitat adjacent to the planning area dependent on the site-specific characteristics of potential well pads, access roads, utility lines, and pipelines.

4.1.2.14.1.4 Pronghorn Antelope

No Surface Occupancy

Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional and horizontal drilling surface disturbance associated with development could still occur within adjacent forest service and private lands. Impacts to pronghorn antelope could include the loss and/or fragmentation of spring-summer-fall seasonal habitat adjacent to the planning area dependent on the site-specific characteristics of potential well pads, access roads, utility lines, and pipelines.

4.1.2.15 Special Status Wildlife Species

4.1.2.15.1 BLM Wyoming Sensitive Species

4.1.2.15.1.1 BLM Sensitive Fish

No Surface Occupancy

Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional and horizontal drilling surface disturbance associated with development could still occur within adjacent forest service and private lands. Habitat degradation though potential sedimentation and vegetation removal from development within adjacent lands could impact the South Beaver Creek population (Map 7).

4.1.2.15.1.2 Migratory Birds

No Surface Occupancy
Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional and horizontal drilling surface disturbance associated with development could still occur within adjacent forest service and private lands.

Migratory bird nesting and foraging habitat degradation and fragmentation could occur due to development activities within adjacent lands dependent on the site-specific characteristics of potential well pads, access roads, utility lines, and pipelines. This includes Brewer's sparrow.

4.1.2.15.1.3 Greater Sage-Grouse
No Surface Occupancy
Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015) for Greater Sage-Grouse GHMA. Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional and horizontal drilling surface disturbance associated with development could still occur within adjacent forest service and private lands. Greater Sage-Grouse breeding, nesting, and brood rearing habitat degradation and fragmentation could occur due to development activities within the planning area and adjacent lands, but are dependent on the site-specific characteristics of potential well pads, access roads, utility lines, and pipelines.

4.1.2.15.1.4 Bald Eagle
No Surface Occupancy
Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional and horizontal drilling surface disturbance associated with development could still occur within adjacent forest service and private lands. Potential bald eagle nesting and foraging habitat could be negatively affected by disturbance and fragmentation associated with development on adjacent lands, but is dependent on the site-specific characteristics of potential well pads, access roads, utility lines, and pipelines.

4.1.2.15.1.5 Long-Billed Curlew
No Surface Occupancy
Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional or horizontal drilling surface disturbance associated with development could still occur within adjacent forest service and private lands. Suitable long-billed curlew nesting and foraging habitat could be negatively impacted by disturbance and fragmentation associated with development on adjacent lands, but is dependent on the site-specific characteristics of potential well pads, access roads, utility lines, and pipelines.

4.1.2.15.1.6 Boreal Toad
No Surface Occupancy

Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional or horizontal drilling surface disturbance associated with development could still occur within adjacent forest service and private lands. Potential boreal toad habitat could be negatively affected by disturbance and fragmentation associated with development on adjacent lands, but is dependent on the site-specific characteristics of potential well pads, access roads, utility lines, and pipelines.

4.1.2.16 Threatened and Endangered Species

4.1.2.16.1 Federally Listed Fish

No Surface Occupancy

Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional and horizontal drilling surface disturbance associated with development could still occur within adjacent forest service and private lands. Development activities would result in the removal of water from the Upper Colorado River Basin. Depletions associated with development and dust abatement on adjacent lands may result in water depletions greater than the 0.1 acre/feet *de minimus* value established by U.S. Fish and Wildlife on August 11, 2009 in their Biological Opinion to the BLM. Subsequent formal ESA Section 7 consultation and associated fees may be required.

4.1.2.16.2 Canada Lynx

No Surface Occupancy

Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional and horizontal drilling surface disturbance associated with development could still occur within adjacent forest service and private lands. In locations where development in adjacent areas overlaps with potential Canada lynx habitat disturbance and fragmentation associated with development may result in negative impacts to both individual Canada lynx and their populations, but is dependent on the site-specific characteristics of potential well pads, access roads, utility lines, and pipelines.

4.1.2.16.3 Gray Wolf

No Surface Occupancy

Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional and horizontal drilling surface disturbance associated with development could still occur within adjacent forest service and private lands. In locations where development in adjacent areas overlaps with potential gray wolf habitat disturbance and fragmentation associated with development may result in negative impacts to both individual gray wolves, their packs and their non-essential experimental populations, but it is dependent on the site-specific characteristics of potential well pads, access roads, utility lines, and pipelines.

4.1.2.16.4 Grizzly Bear

No Surface Occupancy

Within the 5,120 acre planning area the establishment of an NSO would result in effects less than those identified in the 2008 Pinedale RMP as amended (2015). Because the federal fluid mineral estate would be accessible to fluid mineral leasing, directional and horizontal drillings disturbance associated with development could still occur within adjacent forest service and private lands. In locations where development in adjacent areas removes potential grizzly bear disturbance and fragmentation associated with development may result in negative effects to both individual grizzly bears and their populations, but it is dependent on the site-specific characteristics of potential well pads, access roads, utility lines, and pipelines.

4.1.3 Alternative III –Unavailable Area for Leasing

4.1.3.1 Air Quality/Climate Change

Unavailable Area for Leasing

Unavailable Area for Leasing would eliminate future leasing from the project area. As a result, there would not be oil and gas development in the project area and effects to the airshed would be less than those disclosed in the 2008 Pinedale RMP Final Environmental Impact Statement (FEIS) as amended (2015).

4.1.3.2. Cultural Resources

Unavailable Area for Leasing

Unavailable Area for Leasing would eliminate future leasing from the project area. As a result, there would not be oil and gas development in the project area and effects to the cultural resources would be less than the 2008 Pinedale RMP FEIS as amended (2015).

4.1.3.3 Hazardous and Solid Wastes

Unavailable Area for Leasing

The Proposed Action would eliminate future leasing from the project area. As a result, there would not be oil and gas development in the project area and effects from hazardous and solid wastes would be less than the 2008 Pinedale RMP FEIS as amended (2015).

4.1.3.4 Livestock Grazing (Rangeland Resources)

Unavailable Area for Leasing

The Proposed Action would eliminate future leasing from the project area. With livestock grazing concerns, the BLM does not have jurisdiction over non-BLM lands. As a result, there would not be oil and gas development in the project area and effects to the rangeland resources would be less than the 2008 Pinedale RMP FEIS as amended (2015).

4.1.3.5 Mineral Resources

Unavailable Area for Leasing

The Proposed Action would eliminate future leasing from the project area. As a result, there would not be oil and gas development in the project area and effects to the mineral resources would be less than the 2008 Pinedale RMP FEIS as amended (2015). Oil and gas reserves would not be extracted.

4.1.3.6 Noise

Unavailable Area for Leasing

The Proposed Action would eliminate future leasing from the project area. As a result, there would not be oil and gas development in the project area and effects to the area's natural soundscape would be less than what was projected and analyzed in the 2008 Pinedale RMP FEIS as amended (2015).

4.1.3.7 Recreation

Unavailable Area for Leasing

The Proposed Action would eliminate future leasing from the project area. As a result, there would not be oil and gas development in the project area and effects to the recreation resources would be less than the 2008 Pinedale RMP FEIS as amended (2015).

4.1.3.8 Socioeconomics

Unavailable Area for Leasing

The Proposed Action would eliminate future leasing from the project area. As a result, there would not be oil and gas development in the project area. Currently there is no oil and gas development in the project area so there would be little to no impacts to current employment, labor income, and tax revenues associated with oil and gas production. While there are no current leases in the project area, eliminating future leasing from the project area would preclude future lease rental revenue opportunities. As discussed in Chapter 3, lease rental is $1.50 per acre per year for the first five years and $2.00 per acre per year thereafter. Typically, oil and gas leases expire after 10 years unless held by production. Therefore, if the project area of 5,120 acres was leased, the leases could provide a total of $89,600 in lease rental revenue over 10 years, a portion of which would be distributed back to the state and county.

This would mean a lack of $3,763 per year for the first five years and $5,018 per year for the last five years in lease rental revenue associated with public domain minerals being distributed back to Wyoming. Removing 5,120 acres from possible future mineral leasing will also mean there would be no bonus bid revenue if the project area was offered for lease again.

Removing the possibility of leasing and future oil and gas development could impact future employment, labor income, and tax revenue opportunities. However, this would be dependent upon actual development and production amounts. Possible future oil and gas development in the project area could consist of five wells and well pads. Under this alternative there would not be the estimated 29 drilling and completion jobs in total for the five wells, based upon Table A26-1, column 'Other Wells in Planning Area' in Appendix 26 of the 2008 Pinedale RMP (BLM, 2008[b], p. A-26-2) as amended (2015). There would also not be the $1,912,638 in 2015 dollars of labor earnings associated with these drilling and completion jobs, based upon the aforementioned table (Table A26-1).

No additional indirect or induced jobs and labor earnings would be created as discussed in Table 4-18 of the 2008 Pinedale RMP (BLM, 2008[b], p. 4-250) as amended (2015).

Under this alternative, there would be no opportunity for federal mineral royalties, state severance taxes, and ad valorem taxes on production. Compensation to the split-estate landowners as part of surface access agreements would also be foregone.

4.1.3.9 Soil Resources

Unavailable Area for Leasing

The Proposed Action would eliminate future leasing from the project area. As a result, there would not be oil and gas development in the project area and effects to the soil resources would be less than the 2008 Pinedale RMP FEIS as amended (2015). Direct, indirect and cumulative soil effects would not occur beyond current management practices.

4.1.3.10 Vegetation

Unavailable Area for Leasing

There would be a long-term beneficial impact to the vegetation under the Proposed Action. With Unavailable Area for Leasing there would be less risk of the loss of the native plant species in the project area due to surface disturbance and less risk of invasion by non-native species. This would allow the plant communities present in the area to continue through their natural seral stages and improve the health of these ecological communities, which would also improve wildlife habitat.

4.1.3.10.1 Forests/Woodlands

There may be a slight beneficial effect to the forests and woodlands in the project area under the Proposed Action. With less surface disturbance in the area the native conifers and aspens would have fewer effects from invasive weeds and with less fugitive dust, the sustained photosynthetic capability of these species would allow them to contribute to healthier and more complex ecosystems.

4.1.3.10.2 Noxious Weeds and Invasive Species

There would be a long term beneficial effect to the vegetation under the Proposed Action. With the Unavailable Area for Leasing alternative there would be less risk of invasion and spread by noxious weeds and other invasive species in the project area. The potential for new seeds to be brought in with oil and gas activities would be minimized if the lands were not made available for lease and developed. Coupled with the continued use of Integrated Pest Management techniques, the weeds would continue to decrease, which would positively affect the native plant communities.

4.1.3.10.3 Special Status Species (Plants)

There would be a beneficial effect to the Special Status Plant Species in the project area. The habitat where the meadow pussytoes, a BLM Sensitive Species, occurs would be protected from any direct disturbance associated with oil and gas development activities of the federal fluid mineral estate, but could still be adversely effected by other land users. It would also be protected from any indirect impacts from changes in water or air quality from leasing and development activities within the project boundaries, but could still be influenced by other land uses inside and outside of the project area as well as nearby oil and gas development and production.

With this protection, this species would continue to have available habitat in which to colonize and establish other populations. This reduces the need for federal listing of this species under ESA.

4.1.3.11 Wetlands, Riparian Zones and Floodplains

Unavailable Area for Leasing

The Proposed Action would result in fewer effects than analyzed by the 2008 Pinedale RMP as amended (2015). Since the Unavailable Area for Leasing alternative eliminates future fluid

mineral leasing from the 5,120 acre project area, this would result in no development for fluid mineral leasing and fewer effects to the project area. There would be no direct effects from pipeline or road crossings of riparian areas or wetlands (Maps 6 and 7), and no accelerated erosion, run-off or sedimentation caused by roads and well pad development associated with the federal fluid mineral estate.

4.1.3.12 Water Resources
4.1.3.12.1 Surface Water
Unavailable Area for Leasing
The Proposed Action would eliminate future fluid mineral leasing from the project area. As a result, there would not be oil and gas development in the project area and effects to the area would be less than projected by the 2008 Pinedale RMP FEIS as amended (2015). Because there would be no oil or gas development in the project area, there would be less effect to surface water than as disclosed in the 2008 Pinedale RMP as amended (2015).

4.1.3.12.2 Groundwater
Unavailable Area for Leasing
Groundwater resources can be affected by the removal of groundwater from aquifers tapped by local water users and adversely affected by poorly constructed wells that may admit or transmit contaminants into or between aquifers (BLM, 2008[b], p. 4-198 – 4-206; USFS, 2010, p. 3-31 – 3-35).

The Proposed Action would eliminate future fluid mineral leasing from the project area. As a result, there would not be oil and gas development in the project area and effects to the area would be less than projected by the 2008 Pinedale RMP FEIS as amended (2015). Because there would be no oil or gas development in the project area, there would be less effect to groundwater than disclosed in the 2008 Pinedale RMP as amended (2015).

4.1.3.13 Wildland Fire Hazards
Unavailable Area for Leasing
The Proposed Action would eliminate future fluid mineral leasing from the project area. As a result, there would not be oil and gas development in the project area and effects to the area would be less than projected by the 2008 Pinedale RMP FEIS as amended (2015). Because there would be no oil or gas development in the project area, there would be a reduced possibility of wildfire, from industrial activities than if development had occurred.

4.1.3.14 Wildlife and Fish
4.1.3.14.1 Big Game
4.1.3.14.1.1 Elk
Unavailable Area for Leasing
The Proposed Action would eliminate future leasing in the project area. Removal of the 5,120 acre project area from fluid mineral leasing could mean fewer effects to elk than those currently identified in the 2008 Pinedale RMP FEIS as amended (2015). Effects would be similar to those outlined for other Unavailable Areas for fluid mineral leasing. Parturition areas would remain intact for elk within the project area.

4.1.3.14.1.2 Mule Deer
Unavailable Area for Leasing
The Proposed Action would eliminate future leasing in the project area. Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to mule deer than those identified in the 2008 Pinedale RMP as amended (2015) for Traditional Leasing Areas. Effects would be similar to those outlined for other Unavailable Areas for fluid mineral leasing. Seasonal migration routes within and adjacent to the project area would not be disrupted through development activities.

4.1.3.14.1.3 Moose
Unavailable Area for Leasing
The Proposed Action would eliminate future leasing in the project area. Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to moose than those identified in the 2008 Pinedale RMP as amended (2015) for Traditional Leasing Areas. Effects would be similar to those outlined for other Unavailable Areas for fluid mineral leasing. Moose habitat within and adjacent to the project area, including riparian and forested areas, would not be effected by oil and gas development.

4.1.3.14.1.4 Pronghorn Antelope
Unavailable Area for Leasing
The Proposed Action would eliminate future leasing in the project area. Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to pronghorn antelope than those identified in the 2008 Pinedale RMP as amended (2015). Effects would be similar to other Unavailable Areas for fluid mineral leasing. Pronghorn habitat within and adjacent to the project area, including WGFD designated spring-summer-fall seasonal habitat, would not be effected by development.

4.1.3.14.2 Special Status Wildlife Species
4.1.3.14.2.1 BLM Wyoming Sensitive Species

4.1.3.14.2.1.1 BLM Sensitive Species Fish
Unavailable Area for Leasing
Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to Colorado River cutthroat trout and Snake River fine-spotted cutthroat trout than those identified in the 2008 Pinedale RMP as amended (2015). Effects would be similar to those outlined for other Unavailable Areas for fluid mineral leasing. No effects from oil and gas development would occur to the existing occupied habitat for Colorado River cutthroat trout within the South Beaver Creek drainage and for Snake River fine-spotted cutthroat trout within the Upper Hoback River drainage within and downstream of the project area.

4.1.3.14.2.1.2 Migratory Birds
Unavailable Area for Leasing
Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to migratory birds, including the Brewer's sparrow, than those identified in the 2008 Pinedale RMP

as amended (2015) for Traditional Leasing Areas for fluid minerals. Effects would be similar to those outlined for other Unavailable Areas for fluid mineral leasing. No effects from oil and gas development within the project area would occur to the existing habitat within and adjacent to the project area.

4.1.3.14.2.1.3 Greater Sage-Grouse

Unavailable Area for Leasing

Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to Greater Sage-Grouse than those identified in the 2008 Pinedale RMP as amended (2015) for Traditional Leasing Areas for fluid minerals in what is now classified as GHMA. Effects would be similar to those outlined for other Unavailable Areas for fluid mineral leasing in GHMA. No effects from oil and gas development would occur to the existing seasonal breeding, nesting, and brood rearing habitats within and adjacent to the project area or in PHMA.

4.1.3.14.2.1.4 Bald Eagle

Unavailable Area for Leasing

Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to bald eagle than those identified in the 2008 Pinedale RMP as amended (2015) for Traditional Leasing Areas for fluid minerals. Effects would be similar to those outlined for other Unavailable Areas for fluid mineral leasing. While no occupied nests have been identified in the project area, potential suitable nesting and foraging habitats is found within the project area. There would be no effects from oil and gas development activities on potential bald eagle habitats under this alternative.

4.1.3.14.2.1.5 Long-Billed Curlew

Unavailable Area for Leasing

Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to the long-billed curlew than those identified in the 2008 Pinedale RMP as amended (2015) for Traditional Leasing Areas for fluid minerals. Effects would be similar to those outlined for other Unavailable Areas for fluid mineral leasing. Suitable nesting and foraging habitat is found within the project area. There would be no effects from oil and gas development activities within and adjacent to the project area on suitable long-billed curlew habitats under this alternative.

4.1.3.14.2.1.6 Boreal Toad

Unavailable Area for Leasing

Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to the boreal toad than those identified in the 2008 Pinedale RMP as amended (2015) for Traditional Leasing Areas for fluid minerals. Effects would be similar to those outlined for other Unavailable Areas for fluid mineral leasing. There would be no effects from oil and gas development activities within and adjacent to the project area on potential boreal toad habitats under this alternative.

4.1.3.14.3 Threatened and Endangered Species

4.1.3.14.3.1 Federally Listed Fish

Unavailable Area for Leasing

Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to downstream Colorado River fishes mainstem habitats than those identified in the 2008 Pinedale

RMP as amended (2015) for Traditional Leasing Area for fluid minerals. Effects would be similar to those outlined for other Unavailable Areas for fluid mineral leasing. No water depletions or degradation associated with oil and gas development and production in the project area would occur resulting in no effects to the downstream mainstem habitat for Colorado River fishes.

4.1.3.14.3.2 Canada Lynx

Unavailable Area for Leasing

Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to the Canada lynx than those identified in the 2008 Pinedale RMP as amended (2015) for Traditional Leasing Areas for fluid minerals. Effects would be similar to those outlined for other Unavailable Areas for fluid minerals leasing. There would be no effects from oil and gas development activities within or adjacent to the project area on potential Canada lynx habitats under this alternative.

4.1.3.14.3.3 Gray Wolf

Unavailable Area for Leasing

Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to gray wolf than those identified in the 2008 Pinedale RMP as amended (2015) for Traditional Leasing Areas for fluid minerals. Effects would be similar to those outlined for other Unavailable Areas for fluid minerals leasing. There would be no effects from oil and gas development activities within or adjacent to the project area on potential gray wolf habitats under this alternative.

4.1.3.14.3.4 Grizzly Bear

Unavailable Area for Leasing

Removal of the 5,120 acre project area from fluid mineral leasing could result in fewer effects to grizzly bear than those identified in the 2008 Pinedale RMP as amended (2015) for Traditional Leasing Area for fluid minerals. Effects would be similar to those outlined for other Unavailable Areas for fluid minerals leasing. There would be no effects from oil and gas development activities within or adjacent to the project area on potential grizzly bear habitats under this alternative.

4.2 Cumulative Effects

According to the 1994 BLM publication *Guidelines for Assessing and Documenting Cumulative Impacts*, "The cumulative analysis can be focused on those issues and resource values identified by management, the public and others during scoping that are of major importance." Guidance provided in the National BLM NEPA Handbook H-1790-1 (2008[c]), for analyzing cumulative effects issues states, "determine which of the issues identified for analysis may involve a cumulative effect with other past, present, or reasonably foreseeable future actions."

Past, present and reasonably foreseeable future projects are considered under cumulative effects.

4.2.1 Air Quality/Climate Change:

Ongoing oil and gas exploration and production activity near Pinedale and the surrounding area also have the potential to increase ambient levels of air pollutants in the vicinity of the planning area.

Air quality impacts from the NSO Alternative would occur from pollutants emitted during the construction, drilling, completion, and production phases of the NSO Alternative. These would include exhaust from natural gas-, diesel- and gasoline-fueled vehicles, earthmoving equipment, drilling and completion rigs, production equipment and compressors, fugitive dust from vehicular traffic and construction of the proposed well pad and pipeline corridor and gas emissions from the well bore during and after drilling. Pollutants from these activities include NO_x, CO, SO_2, PM10, PM2.5, VOCs and Hazardous Air Pollutants (HAPs). Ozone formation may occur from NO_x and VOC emissions. The construction and drilling phase is expected to take approximately 20 days per well to complete and the air quality impacts from these activities would be temporary.

Activities associated with the proposed location would produce the ozone precursor emissions NO_x and VOCs. However, minimal impacts are expected on the existing air quality. The amount of emissions produced varies with the type of equipment used for drilling, completions, and production operations. The operator would be required to file an application for an air quality permit from the Wyoming Department of Environmental Quality (WDEQ) for oil and gas production facilities under Section 21 of the Wyoming Air Quality Standards and Regulations.

Air quality impacts can be mitigated by implementing BMPs and/or applying emissions control technologies such as those required in the WDEQ-AQD Chapter 6, Section 2, Oil and Gas Permitting Guidance (Revised March 2010). The BLM is cooperatively developing policy with the WDEQ to define what information and practices would be required for new and existing development and production activities within the Upper Green River Basin ozone non-attainment area. Operators would apply BACT (Best Available Control Technologies) measures as applicable to minimize emissions from their project and to permit their emission sources with the WDEQ. Other opportunities for permitting and using emission reduction technologies and methods are also available for completions and production, and operators are strongly encouraged to aggressively pursue these measures.

Other future projects in the immediate area to be considered for cumulative impacts with air resources, include the Bridger Teton National Forest Wyoming Range Oil and Gas Leasing Project approximately three miles to the west and southwest of the planning area, and on various small parcels in the Wyoming Range. The estimated reasonably foreseeable development (RFD) analysis for that project's 39,450 acres is for up to five coalbed methane wells and 18 conventional natural gas wells for a total of 24 wells that could be drilled in the next 10-15 years.

The drilling and production of wells subsequent to leasing could result in emissions impacting air quality and air quality related values in adjacent Class I areas, with emphasis on cumulative effects because of extensive development in the Pinedale area. Visibility impairment in Class I areas is a concern. Particulate matter concentrations and emissions of nitrogen oxides (NO_x), sulfur dioxide (SO_2) and volatile organic compounds (VOCs) including human health consequences of these pollutants are of concern. Consequences of secondary ozone formation are of concern due to potential impacts on human and vegetation health.

Another future project is proposed by the QEP Energy Company (QEP) proposes to develop an industrial project in the Dry Piney Creek area about 10 to 12 miles northwest of La Barge, Wyoming. The proposal includes constructing a gas processing plant for the production of helium,

methane, and carbon dioxide and includes an estimated 10 gas-production wells with associated access roads, buried gathering pipelines, four carbon dioxide injection wells, an overhead electric transmission line, a power substation, one water supply well, one produced-water well, and one sour-gas disposal well.

Based on preliminary emissions calculations, it is anticipated that the gas-processing plant and associated wells, pipelines and power line would be a minor source of air emissions, and would fall below the Prevention of Significant Deterioration (PSD) major source thresholds for all criteria pollutants and would conform to WDEQ's interim offset policy for NO_x and VOCs as criteria pollutants. In addition, the project would comply with the BLM's general conformity rule as outlined in 40 CFR § 93 – Determining Conformity of Federal Actions to State or Federal Implementation Plans.

Another proposed project in the area is the Riley Ridge Unit Development Project. The proposal includes three wells on federal land, one on state land and one on private land totaling about 21 acres for well pad construction. New pipelines would connect the five proposed wells and two existing wells to the Riley Ridge methane and helium recovery facility.

Air emission information is not yet available for these proposed projects.

4.2.1.1 No Action: Since the No Action alternative would not change the 2008 Pinedale RMP as amended (2015), the cumulative effects with No Action would be similar to those cited in the 2008 Pinedale RMP (BLM, 2008[b], p. 4-276 – 4-278) as amended (2015). There have been additional effects from projects that have occurred since the 2008 Pinedale RMP. As noted in the Affected Environment, Air Quality Resources section, on April 30, 2012, the USEPA formally designated the Upper Green River Basin area as a "Marginal" ozone nonattainment area. As a result of nonattainment, the BLM must comply with General Conformity regulations.

4.2.1.2 Unavailable Area for fluid mineral leasing: Since the Unavailable Area for fluid mineral leasing alternative would eliminate future oil and gas leasing from the planning area, there would be less cumulative effects to air resources than are disclosed in the 2008 Pinedale RMP as amended (2015).

4.2.1.3 No Surface Occupancy: Cumulative effects with the NSO alternative are the same as the No Action alternative and more than with the Unavailable Area for fluid mineral leasing alternative.

4.2.2 Cultural Resources

4.2.2.1 No Action: Since the No Action alternative would not change the 2008 Pinedale RMP as amended (2015), the cumulative effects with No Action would be similar to those cited in the 2008 Pinedale RMP (BLM, 2008[b], p. 4-279 – 4-281) as amended (2015). There would, however, be the additional cumulative effects from activities that have occurred since the effects disclosed in the 2008 Pinedale RMP.

4.2.2.2 Unavailable Area for fluid mineral leasing: Since the Unavailable Area for fluid mineral leasing alternative would eliminate future oil and gas leasing from the planning area, there would be less cumulative effects to resources than are disclosed in the 2008 RMP as amended (2015).

4.2.2.3 No Surface Occupancy: Cumulative effects with the NSO alternative are the same as the No Action alternative.

4.2.3 Hazardous and Solid Wastes

4.2.3.1 No Action: Since the No Action alternative would not change the 2008 Pinedale RMP as amended (2015), the cumulative effects with No Action would be similar to those cited in the 2008 Pinedale RMP as amended (2015). The 2008 Pinedale RMP's Reasonably Foreseeable Development (RFD) estimation as amended (2015) is 20 oil and gas wells per township. The planning area is in T36N. The planning area equals roughly a quarter of the township, therefore the RFD scenario for the 5,120 acre planning area equals five wells. There would, however, be the additional effects from activities that have occurred since the effects disclosed in the 2008 Pinedale RMP. All applicable regulations will be met.

4.2.3.2 Unavailable Area for fluid minerals leasing: Since the Unavailable Area for fluid minerals leasing alternative would eliminate future oil and gas leasing from the planning area, there would be fewer cumulative effects to resources than are disclosed in the 2008 Pinedale RMP as amended (2015).

4.2.3.3 No Surface Occupancy: Cumulative effects with the NSO alternative are the same as the No Action alternative. With the NSO alternative, the extraction of federal oil and gas and minerals would be allowed from subsurface reserves, but no related development or other surface disturbance would be permitted on the privately-owned surface lands of the planning area. When accessing federal fluid minerals, regardless of surface ownership, applicable federal regulations, and if necessary, ROWs would need to be fulfilled.

For many resources, the BLM does not have jurisdiction on private or state surface lands. All access to the underground oil and gas reserves would need to be from adjacent state, private or U.S Forest Service lands. Access estimates with this alternative, based on existing technology, are that oil and gas development could be accessed from roughly one mile away or closer. There would be less cumulative effects from fluid minerals leasing for the planning area, since there would be no surface occupancy or surface development. Based on the 2008 Pinedale RMP as amended (2015), there could potentially be five wells directionally or horizontally drilled into the planning area from five separate pads located on private, state or other federally-owned surface properties outside of the planning area.

4.2.4 Livestock Grazing (Rangeland Resources)

4.2.4.1 No Action: Since the No Action alternative would not change the 2008 Pinedale RMP as amended (2015), the cumulative effects with No Action would be similar to those cited in the 2008 Pinedale RMP (BLM, 2008[b], p. 4-282 – 4-283) as amended (2015). Specific information about grazing and the conditions of the rangeland resource in the planning area, which is entirely private property, was not available.

4.2.4.2 Unavailable Area for fluid minerals leasing: Since the Unavailable Area for fluid minerals leasing alternative would eliminate future oil and gas leasing within the planning area, there would be less cumulative effects to resources than are disclosed in the 2008 Pinedale RMP FEIS as amended (2015).

4.2.4.3 No Surface Occupancy alternative: Cumulative effects with the NSO alternative are the same as the No Action alternative.

4.2.5 Mineral Resources

Adjacent to the planning area is the U.S. Forest Service project known as the "Oil and Gas Leasing in Portions of the Wyoming Range in the Bridger-Teton National Forest," covering approximately 41,550 acres in 33 parcels on national forest system lands. This project is under consideration for oil and gas leasing and subsequent to public meeting and comment periods for the 2016 draft Supplemental EIS (DSEIS), the preferred alternative chosen by the BTNF converts this acreage to an Unavailable Area for fluid minerals leasing.

4.2.5.1 No Action: Since the No Action alternative would not change the 2008 Pinedale RMP as amended (2015), the cumulative effects with No Action would be similar to those cited in the 2008 Pinedale RMP FSEIS (BLM, 2008[b], p. 4-283 – 4-286) as amended (2015). Based on the 2008 Pinedale RMP as amended (2015), there may be five wells drilled within the planning area from five separate pads.

4.2.5.2 Unavailable Area for fluid minerals leasing: Since the Unavailable Area for fluid minerals leasing alternative would eliminate future oil and gas leasing from the planning area, there would be fewer cumulative effects to resources than are disclosed in the 2008 Pinedale RMP as amended (2015).

4.2.5.3 No Surface Occupancy: Cumulative effects with the NSO alternative are tied to drilling and completions for five oil and gas wells that are directionally or horizontally drilled from private, state, or other federally-owned surface properties outside of the planning area. Cumulative effects would be similar to those cited in the 2008 Pinedale RMP (BLM, 2008[b], p. 4-283 – 4-286) FEIS as amended (2015).

4.2.6 Noise

4.2.6.1 No Action

Under the No Action alternative, the 2008 Pinedale RMP as amended (2015) would not change and cumulative effects on the natural soundscape from anthropogenic noise would be similar to estimates from development activities as noted in *Sound Levels Greater Sage-Grouse Leks, Pinedale Anticline Project Area, Wyoming, April 2013* (Ambrose and Florian), a study conducted for the WGFD.

4.2.6.2 Unavailable Area for fluid minerals leasing: Since the Unavailable Area for fluid minerals leasing alternative would eliminate future oil and gas leasing from the planning area, there would be fewer cumulative effects to resources than are disclosed in the 2008 Pinedale RMP FEIS as amended (2015).

4.2.6.3 No Surface Occupancy: Cumulative effects with the NSO alternative are the same as the No Action alternative.

4.2.7 Recreation
4.2.7.1 No Action: Since the No Action alternative would not change the 2008 Pinedale RMP as amended (2015), the cumulative effects with the No Action alternative would be similar to those cited in the Pinedale RMP (BLM, 2008[b], p. 4-286 – 4-287) FEIS as amended (2015).

4.2.7.2 Unavailable Area for Leasing: Since the Unavailable Area for Leasing alternative would eliminate future oil and gas leasing from the planning area, there would be fewer cumulative effects to resources than are disclosed in the 2008 Pinedale RMP as amended (2015).

4.2.7.3 No Surface Occupancy alternative: Cumulative effects with the NSO alternative are similar to the No Action alternative.

4.2.8 Socioeconomics
4.2.8.1 No Action: The 2008 Pinedale RMP as amended (2015) would not change under the No Action alternative, so cumulative effects would be similar to those disclosed in the 2008 Pinedale RMP (BLM, 2008[b], p. 4-287 – 4-289) as amended (2015).

4.2.8.2 Unavailable Area for fluid minerals leasing: Since the Unavailable Area for fluid minerals leasing alternative would eliminate future oil and gas leasing from the planning area, there could be less economic activity associated with oil and gas development than is disclosed in the 2008 Pinedale RMP as amended (2015).

4.2.8.3 No Surface Occupancy: Cumulative effects would be similar to those disclosed earlier in this document for NSO. Development of federal fluid minerals could occur with directional or horizontal drilling of five oil and gas wells from private, state or other federally-owned surface properties outside of the planning area. Because the NSO alternative would have the same estimated number of conventional oil and gas wells as the No Action alternative, cumulative effects will be similar to those noted in the 2008 Pinedale RMP (BLM, 2008[b], p. 4-287 – 4-289) as amended (2015).

4.2.9 Soil Resources: Cumulative soil effects for the NSO Alternative would be similar to the No Action alternative and what was analyzed in the 2008 Pinedale RMP as amended (2015). The third alternative, Unavailable Area for fluid minerals leasing would have fewer and lower magnitude cumulative effects on soil than analyzed in the 2008 Pinedale RMP as amended (2015).

4.2.10 Vegetation
4.2.10.1 No Action: The 2008 Pinedale RMP as amended (2015) will not be changed and cumulative effects will remain the same as they are described (BLM, 2008[b], p. 4-290 – 4-291).

4.2.10.2 Unavailable Area for fluid minerals leasing: There would be a long-term beneficial impact to the vegetation under the Unavailable Area for fluid minerals leasing alternative. There would be less cumulative effects than is noted in the 2008 Pinedale RMP as amended (2015).

With the Unavailable Area for fluid minerals leasing alternative, there would be less risk of the loss of the native plant community and extirpation of any plant species in the planning area associated with surface disturbance and less risk of invasion and spread by noxious weeds and other unwanted species. This would allow the plant communities present in the area to continue to progress through their natural seral stages and improve the ecological health of these plant communities which would also improve wildlife habitats.

4.2.10.3 No Surface Occupancy: Cumulative effects tied to the NSO alternative on non-BLM managed surface property are estimated to be similar to the No Action alternative and the cumulative effects described in the 2008 Pinedale RMP as amended (2015).

4.2.11 Forests/Woodlands
4.2.11.1 No Action: The 2008 Pinedale RMP as amended (2015) will not be changed and cumulative effects will remain the same as they are described (BLM, 2008[b], p. 4-290 – 4-291).

4.2.11.2 Unavailable Area for fluid minerals leasing: There would be a long-term beneficial impact to the vegetation under the Unavailable Area for fluid minerals leasing alternative. There would be less cumulative effects than is noted in the 2008 Pinedale RMP as amended (2015).

4.2.11.3 No Surface Occupancy: Cumulative effects from the NSO alternative on this privately-owned, split-estate acreage are estimated to be similar to the No Action alternative and the cumulative effects noted in the 2008 Pinedale RMP as amended (2015).

4.2.12 Noxious Weeds and Invasive Species
4.2.12.1 No Action: The 2008 Pinedale RMP as amended (2015) will not be changed and therefore the cumulative effects will remain the same as disclosed (BLM, 2008[b], p. 4-290 – 4-291).

4.2.12.2 Unavailable Area for fluid minerals leasing: There would be a long-term beneficial effect and less possibility of noxious weeds and other undesirable plant species under this alternative. There would be less cumulative effects than is noted in the 2008 Pinedale RMP as amended (2015).

4.2.12.3 No Surface Occupancy: Cumulative effects from NSO on property with surface not managed by the BLM are estimated to be similar to the No Action alternative and cumulative effects described in the 2008 Pinedale RMP as amended (2015).

4.2.13 Vegetation- Special Status Species (Plants)
4.2.13.1 No Action: The 2008 Pinedale RMP as amended (2015) will not be changed under the No Action alternative and the cumulative effects will remain the same as disclosed (BLM, 2008[b], p. 4-290 – 4-291).

4.2.13.2 Unavailable Area for fluid minerals leasing: There would be a long-term beneficial effect to the plant communities from having less oil and gas development in the area. Coupled with the post-2008 conservation easements, there would be less cumulative effects than described in the 2008 Pinedale RMP as amended (2015).

4.2.13.3 No Surface Occupancy: Cumulative effects from NSO on the surface estate for properties not managed by the BLM are estimated to be similar to the No Action alternative and the cumulative effects described in the 2008 Pinedale RMP as amended (2015).

4.2.14 Wetlands, Riparian Zones and Floodplains

4.2.14.1 No Action: The 2008 Pinedale RMP as amended (2015) will not be changed under the No Action alternative and the cumulative effects will remain as described in the 2008 Pinedale RMP as amended (2015).

4.2.14.2 Unavailable Area for fluid mineral leasing: There will be less cumulative effects under the Unavailable Area for fluid mineral leasing than noted in the 2008 Pinedale RMP as amended (2015) with Traditional Area for leasing.

4.2.14.3 No Surface Occupancy: Cumulative effects for wetlands, riparian zones, and floodplains would be similar to the No Action alternative.

4.2.15 Water Resources

4.2.15.1 Surface Water

4.2.15.1.1 No Action: The 2008 Pinedale RMP as amended (2015) will not be changed under the No Action alternative and the cumulative effects will remain as noted in the 2008 Pinedale RMP as amended (2015).

4.2.15.1.2 Unavailable Area for fluid minerals leasing: There will be less cumulative effects under the Unavailable Area for fluid minerals leasing than noted in the 2008 Pinedale RMP as amended (2015) with Traditional Areas for leasing.

4.2.15.1.3 No Surface Occupancy Alternative: Cumulative effects are similar to the No Action alternative cumulative effects. The only way to access the fluid minerals in the subsurface federal minerals estate beneath the planning area would be to use directional or horizontal drilling from adjacent private, state, or other federal surface along the east and south side of the property in the upper Green River Basin and along the north boundary of the property in the Snake River Basin. Cumulative effects to surface water would occur on adjacent property that is being drilled. Most cumulative effects would be directed downstream or down gradient from the property boundary, assuming headcutting is controlled. The state and private sections would be downstream of surface streams on the planning area and in different subwatersheds and basins.

Cumulative effects to surface water and springs could occur downstream of the planning area due to soil erosion and increased surface runoff from surface disturbance for well pads and roads associated with oil and gas drilling activities (Map 7). Spills or releases of hazardous materials could adversely affect water quality in surface streams downstream of the drilling activity. Downstream effects would immediately take place on private lands within the upper Green River Basin and potentially downstream on public and private lands, depending on the scale of the degradation.

Cumulative effects could occur in Muddy Creek on U.S. Forest Service lands from increased surface runoff and increased soil erosion due to surface disturbance from well pads and roads associated with well drilling on private lands adjacent to the property. Muddy Creek is a tributary of the Snake River (Map 7).

4.2.15.2 Groundwater

4.2.15.2.1 No Action: The 2008 Pinedale RMP as amended (2015) will not be changed under the No Action alternative and the cumulative effects will remain as noted in the 2008 Pinedale RMP FEIS as amended (2015).

4.2.15.2.2 Unavailable Area for fluid minerals leasing: There will be less cumulative effects than noted in the 2008 Pinedale RMP as amended (2015).

4.2.15.2.3 No Surface Occupancy: Cumulative effects to groundwater could occur from any NSO development, and possibly be effected by other development on property with surface not managed by the BLM. Cumulative effects may occur to water wells downstream or gradient from the private or state property wells if there would be improper construction of oil and gas wells from state or private lands adjacent to the planning area.

There are no anticipated cumulative effects to groundwater from wells south, east or north of the planning area. Cumulative effects could occur because of potential improper construction of oil and gas wells from state or private lands adjacent to the property. Any drilling in these areas would be in general down gradient of the property, but groundwater flow directions and the influence of pumping could change this prediction. Cumulative effects could occur to water wells located down gradient of the drilling activities that would occur on private or state lands.

4.2.16 Wildland Fire Hazards

4.2.16.1 No Action: The 2008 Pinedale RMP as amended (2015) will not be changed under the No Action alternative and the cumulative effects will remain as noted in the 2008 Pinedale RMP FEIS as amended (2015).

4.2.16.2 Unavailable Area for fluid minerals leasing: There will be less cumulative effects than noted in the 2008 Pinedale RMP as amended (2015).

4.2.16.3 No Surface Occupancy: Cumulative effects would be similar to the No Action alternative. Oil and gas surface development would be on lands adjacent to the planning area. If development occurs on the adjacent Wyoming state section, on adjacent U.S. Forest Service lands or on adjacent private property with directional or horizontal drilling to access federal fluid minerals underneath the privately-owned surface planning area, there is the potential for fires started by those oil and gas developments.

4.2.17 Wildlife and Fish (*For all species):*

4.2.17.1 No Action: Cumulative effects under the No Action alternative would be similar to those noted in the 2008 Pinedale RMP as amended (2015).

4.2.17.2 Unavailable Area for fluid minerals leasing: Cumulative effects associated with development would no longer have the potential to occur in the planning area, and therefore, associated cumulative effects would be less than those described in the 2008 Pinedale RMP as amended (2015) with Traditional Area for oil and gas leasing.

4.2.17.3 No Surface Occupancy: Because the federal fluid mineral estate would be accessible via directional or horizontal drilling under the NSO alternative, surface disturbance associated with development from adjacent forest service and from private lands, development on adjacent property, plus other area development projects could negatively impact wildlife habitats and populations through disturbance and fragmentation of seasonal habitats and migration routes.

5.0 Tribes, Individuals, Organizations, and Agencies Consulted

Cooperating agencies consulted during the preparation of this EA include:
Sublette County Commission
Sublette County Conservation District
Wyoming Governor's Office
Wyoming Game and Fish Department
Wyoming Office of State Lands and Investments
Wyoming Department of Environmental Quality
Wyoming State Historical Preservation Office
Wyoming Department of Agriculture
Wyoming State Engineer's Office
Wyoming Geological Survey
Wyoming Water Development Commission
U.S. Environmental Protection Agency
U.S. Bureau of Reclamation
U.S. Fish and Wildlife Service
U.S. Forest Service

In consultation with the Wyoming State Historical Preservation Office (WYSHPO) and BLM-PFO staff, it was decided that formal Native American tribal consultation (i.e., government to government consultation) was not warranted for this split-estate project. Federally-managed cultural properties will not be affected by this project, which is entirely on private surface lands.

However, the Shoshone-Bannock Tribes, the Blackfeet Tribe, the Northern Ute Tribe, the Eastern Shoshone Tribe, the Northern Arapaho Tribe, and the Comanche Nation tribes were invited to participate and review and comment on the document. Native American tribes were contacted via email, and if email was not available, by letter. The Northern Arapaho, the Shoshone-Bannock Tribes, and the Comanche Nation responded that they wanted to participate and review EA drafts. These tribes received drafts of the EA and had an opportunity to provide comments on the document, which were considered for inclusion and made part of the Administrative Record.

6.0 List of Preparers/Interdisciplinary Team

The BLM ID team that prepared this EA:

Lauren McKeever	Planning & Environmental Specialist (Team Lead)
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